

**SPY SHOTS! 3 HOT NEW MONSTER TRUCKS**

PAGE 33

**RADIO CONTROL**

# car action

THE WORLD'S BEST-SELLING RC CAR MAGAZINE

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NOVEMBER 2002

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## The year of the truck

**A**lmost exactly one year ago, this space was devoted to the topic of touring cars and the dominance of sedans as RC's most prolific category. It was the December 2001 issue, and with an 11-car touring comparison test between the covers, I think anyone would have had touring cars on the brain. But now the RC world is shifting on its axis yet again, and the immediate future is clear: nitro monster trucks will rule. The category is already strong, thanks in large part to the widespread popularity of the Traxxas T-Maxx, which everyone is now out to beat. Tamiya's Terra Crusher went for a "bigger-is-better" approach; OFNA's Monster Pirate and Dominator bring the heat, buggy-style; DuraTrax's Thunder Quake adds a wide-track suspension and a reversing 2-speed tranny to the big-block, buggy-based truck formula; Kyosho's straight-axle, 3-speed, chain-drive Mad Force is the fastest .21-powered monster we've driven to date, and Thunder Tiger is the official king of displacement with its .70-powered EK4-S2. That's five trucks right there—six if you include the Thunder Quake's older (but still available) stablemate, the Nitro Quake.

Now let's look ahead, which is as easy as flipping through the pages of this issue. First and foremost, we have Traxxas' T-Maxx follow-up (see the "First Drive" on page 78), which we've started to call the "2.5" because of its all-new TRX 2.5 engine; the truck itself is still simply called "T-Maxx." The Titan ("First Looked" last month) is OFNA's first shot at a lifted-chassis monster, and it punches out the big-block standard to .25. In this month's "Inside Scoop," we reveal the HPI Savage 21 and Associated's big-block shocker of the moment, the "BFT"—plus sneak-peek details of a new XTM Racing monster machine. All this, and we have yet to see what will be officially released for 2003! (That will be in next month's issue, after the big Chicago show).

Make no mistake: 2003 will be the year of the nitro monster truck and a great year for RC. All of the aforementioned machines will be offered ready to run, and though I'd love to see kit options for us hardcore wrenchers, I am glad that those who prefer instant gratification will have ample opportunity to be instantly gratified. And with so many trucks vying for your RC dollars, you can bet the manufacturers will offer them to distributors and shops at the lowest prices they can stand, and this will make them that much more affordable for you and me.

Now, if only we could get some more action on the electric side of the monster truck scene ...

Peter Vieira  
Executive Editor

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## READERS WRITE

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### 4WD FINDER

I need help; I can't decide which 4WD buggy to buy. My choices are Yokomo MR4-BC, Schumacher Cat 3000 and Team Losi Double-X4.  
*Jason Tang*

Do you plan to actually race the car? The short-wheelbase MR-4 BC never really gelled on the racetrack, but I had a blast playing with the BC when I reviewed it (and its truck counterpart, the MR-4 MT) in the July 2000 issue. If you are out for play, don't forget Tamiya's Manta Ray and Top Force Evo ready-to-runs; they aren't as performance-oriented as the Yoke, but they are super-tough. If you want to race, choose between the Losi and the Schumacher, and the best way to make that call is to check out our "Head to Head" shootout between the two buggies in the December 2000 issue (we picked the Losi, but it was close).

—Pete

### RC PERSONALS

Hey, all you smart people, I just got into RC last Christmas with a beginner (and I do mean beginner) RTR, and I recently got a shiny new T-Maxx; however, I can't find anyone to race with! I've heard of everyone going out and racing with their buddies, but I haven't found anyone! In case others have this problem, I thought perhaps you could make a kind of "friend finder" on your website; then again, that might not work out very well. Anyway, great job with your magazine and website; I look forward to it every month!

By the way, I live in Charlotte, NC, and my email is Skip@perigee.net.

*Nicholas*

Visit rccaraction.com and join the "RC Zone" bulletin board; post in the "Regional Forums" section, and I'm sure you'll hook up with some Maxx guys in your area.

—Pete

### UH, THANKS

I think your magazine is the greatest! The "Backlot" section got a little worse after Chris left, but it is still pretty good. I am 13 and very new at the "action sport." My first and only car is the HPI Dash. Why haven't you guys tested it? I'm just kinda disappointed that my first car hasn't been tested (yet?). I am saving for a DuraTrax Evader ST, though. Keep up the great mag!

*Robbie Sellers*

We'll get to the Dash; it deserves a look. HPI did a good job of bringing hobby-shop quality to the toy-store price level, and the car's compatibility with standard touring wheels and HPI bodies is a big plus. And thanks for your compliment on the "Backlot," I think.

—Pete

### SPEED STICK STUMPED

On "Street Muscle" Project Speed Stick (September 2002), you said you installed a receiver pack so the radio wouldn't get the power of 12 cells. After about 15 minutes of "late-night insomnia" searching, I can't find a receiver pack on the car. What did you use? I do see that you took the red wire out of the ESC's receiver plug. Also, why do you guys remove the body posts for photo shoots? Other than being confused by those items, I enjoyed your "Street Muscle" article. Keep up the good work, and have fun—which is what it's all about.

*Matt Clemens*



Kevin Hetmanski lent me a tiny 600mAh pack he built for some long-forgotten project, and I installed it on top of the T-plate—but only after the chassis shot had already been taken! Good eye, though; sorry the missing pack tweaked your melon. As for those body posts ... we usually leave them on—unless they're distractingly ugly or ridiculously long and we're afraid to cut them down because we haven't mounted the body yet. You'll also notice that the receiver antennas are always missing in chassis shots; we wrap them up and hide them behind the receiver or under the chassis. We just do it for a cleaner shot.

—Pete

### NO NEED TO KEEP RACING AFTER YOU'VE WON

In the race coverage articles, I frequently read that drivers sit out the third Main because they've already won the first two. I think that's really arrogant and lazy. Out of respect for the other drivers, they should race in all the races; that's what I would do. [email]

*Paul Milleman*

Actually, Paul, it's out of respect for the other racers that drivers in such situations *don't* race the third Main if they've won the first two. Let's say I just won the first two Mains (I know it's a stretch, but work with me). It is now mathematically impossible for anyone to win the event. Even if I ran dead last in the third Main, that result would not be counted; in a three-Main format, each driver's worst finish is thrown out. Legally, I could race the third Main, but all I would



# HOTSTUFF

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## READERS WRITE

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really be doing is screwing up the guys battling for the lower positions. What if I tangle with the guy who's been working hard all weekend to do the best he can—and who

stands to get second place—but I knock him back to last in a race I didn't even have to be in? Now *that* would be arrogant!

—Pete

## YOU SAID IT

### "The only line I can agree with is the title"

Your "Starting Line" editorial in the September 2002 issue couldn't be further from the truth. The only line I can agree with is the title. Radio control is more than a hobby, it's a study in evolution, invention and a driving force of technology. So you wanna call it a sport, eh? Is chess a sport? How 'bout video games? What about jacks? Seems you're confusing competition with sports. If people want to get together and race their RC cars, that's fine. They want to compete, that's all. But they can also race their turtles or their belt sanders, all without knowing how to adjust linkages and set camber. It seems you want everyone to walk into the K-Mart sports department and pick up a box of "RC car" and head to the races. That's the opposite of what this *hobby* is all about. That car or truck is supposed to be an extension of *you*, your creation, or at least your expression—that teaches you something. I'd rather learn something, no matter how insignificant, than have all the trophies in the world. You think it's "... important not to have a hobby mindset"? That's because it pays your bills. Hobby: an activity or interest pursued outside one's regular occupation and engaged in primarily for pleasure. I have been involved in RC for more than 25 years. I worked in a hobby shop for two of those years and noticed something: the people who couldn't build their own cars did not stay involved in RC for long. Driving them around was fun, but not understanding what made them work left them unfulfilled when the novelty wore off. And they could not be competitive at all without the knowledge. So when someone says, "RC is too difficult a hobby for me," I say "OK. It probably is. It's too difficult for most people. That's what makes it so interesting."

Peter, Queens, NY

PS: Ready-to-run is ruining the hobby.

Peter, I appreciate your passion, but I think you should re-read my editorial. I state up front that RC meets the definition of a hobby and later say that whether we refer to RC as a "hobby" or "action sport" doesn't really matter; what does matter is having the right attitude about RC and not clinging to a "hobby mindset." I said, "If you're the type who gets upset because ready-to-run kits are 'ruining the hobby,' then you aren't thinking big enough. If you think RC is somehow reserved for a special few and isn't for everyone, then you have a hobby mindset." I just don't see how opening up RC to all those who would like to try it is a bad thing, and I don't see how turning people away by telling them RC is "too difficult for them" is a good thing. If "Joe RTR" doesn't stick with RC, that's fine; the money he spent still went into the industry, and for every guy who doesn't "stick," many more do. Do you think the Traxxas T-Maxx, which is sold only as an RTR, is "ruining the hobby"? How many guys joined our ranks solely because of this ready-to-run truck? If it weren't for RTRs, many of the newcomers who have helped to make RC bigger than ever would have never given RC a shot.

There will always be room for guys like you and me who prefer to build everything ourselves—I've yet to see an RTR that couldn't be taken apart. But we shouldn't shut anyone out of RC; more people means more products, more diversity and more fun.

—Pete

Each month, "Readers Write" sponsor Team Trinity awards the "You said it" letter writer the Reference body of his choice. This is Trinity's new shell for the Associated RC10GT.



**WRITE TO US!** We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

■ Peter Vieira: [peter@airage.com](mailto:peter@airage.com)  
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■ Greg Vogel: [gregv@airage.com](mailto:gregv@airage.com)





## HPI Savage

HPI caught the RC world off-guard with its incredible new Savage that combines a scale-like, ladder-style chassis with the preferred 8-shock, independent-suspension setup and .21 pull-start power. HPI plans to offer the Savage as a ready-to-run and stresses that the truck is not a "big-block conversion" but was designed from the start to handle the (reportedly) prodigious output of the truck's Nitro Star 21BB engine.

According to HPI, the engine features true ABC chrome-sleeve construction, a fully adjustable dual-needle 7mm slide carburetor, a large aluminum heat-sink head and a high-performance exhaust system with a high-flow tubular header and a large dual-chamber tuned pipe. The engine and the shaft-driven, full-time 4WD drive train it powers are packed into a "TVP" (twin vertical plate) chassis constructed of polished aluminum. In addition to the standard "GT-1" body, HPI has plans for El Camino and Dodge Ram bodies, and likely chassis options include a reverse module for the transmission and anodized-aluminum upgrade parts.

You'll also be able to hop up the Savage with some of the many items offered for the Traxxas T-Maxx; all wheels, tires and bodies designed for the Maxx also fit the Savage.



## SAVAGE SURPRISE!

### SAVAGE 21 FEATURES

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  - > Adjustable slipper clutch.
  - > Stainless-steel inboard hinge pins with anodized-aluminum braces.
  - > Large 160cc fuel tank with primer.
  - > Enclosed radio box to protect electronics.
  - > Factory-painted, trimmed and decaled GT-1 truck body.
- HPI Racing (949) 753-1099; hpiracing.com.

**ASSOCIATED "BFT"** According to the A-Team, "Project BFT" will be powered by a rear-exhaust .21 engine and will include an aluminum "backbone" chassis, a 2-speed tranny, extra-long arms with adjustable pivot-ball suspension suspended by eight oil-filled shocks and huge monster-style tires and wheels. It will also have a factory-painted body, but there's no word yet on the final paint scheme (the flag look would be cool though).

If you visit Associated's website, you'll see additional pics that reveal the engine's transverse mounting position, a slipper clutch, a dual-exhaust system, enclosed battery and receiver boxes and external shock reservoirs. Some of these details may not make it to production, but maybe they all will—and then some! The suspense is killing you, isn't it?



Team Associated  
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teamassociated.com;  
rc10.com.

**BIGGER  
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TOUGHER**





**XTM Racing Nitro Monster** So far, the only things XTM has leaked about its nitro monster truck project are this silhouette photo and a few broad details: the new truck will be as big as or bigger than any nitro monster currently available, and it's slated to include XTM's high-output 24.7 engine and a 2-speed tranny. XTM

didn't mention this, but you can also clearly see the truck's straight axles and 4-link suspension. The new XTM machine could be the first truck to truly bridge the gap between real monster suspension tech and nitro power! All we can do is wait.

XTM Racing; distributed by  
Global Hobby Distributors  
(714) 964-0827;  
globalhobby.com.

**Mystery Machine**

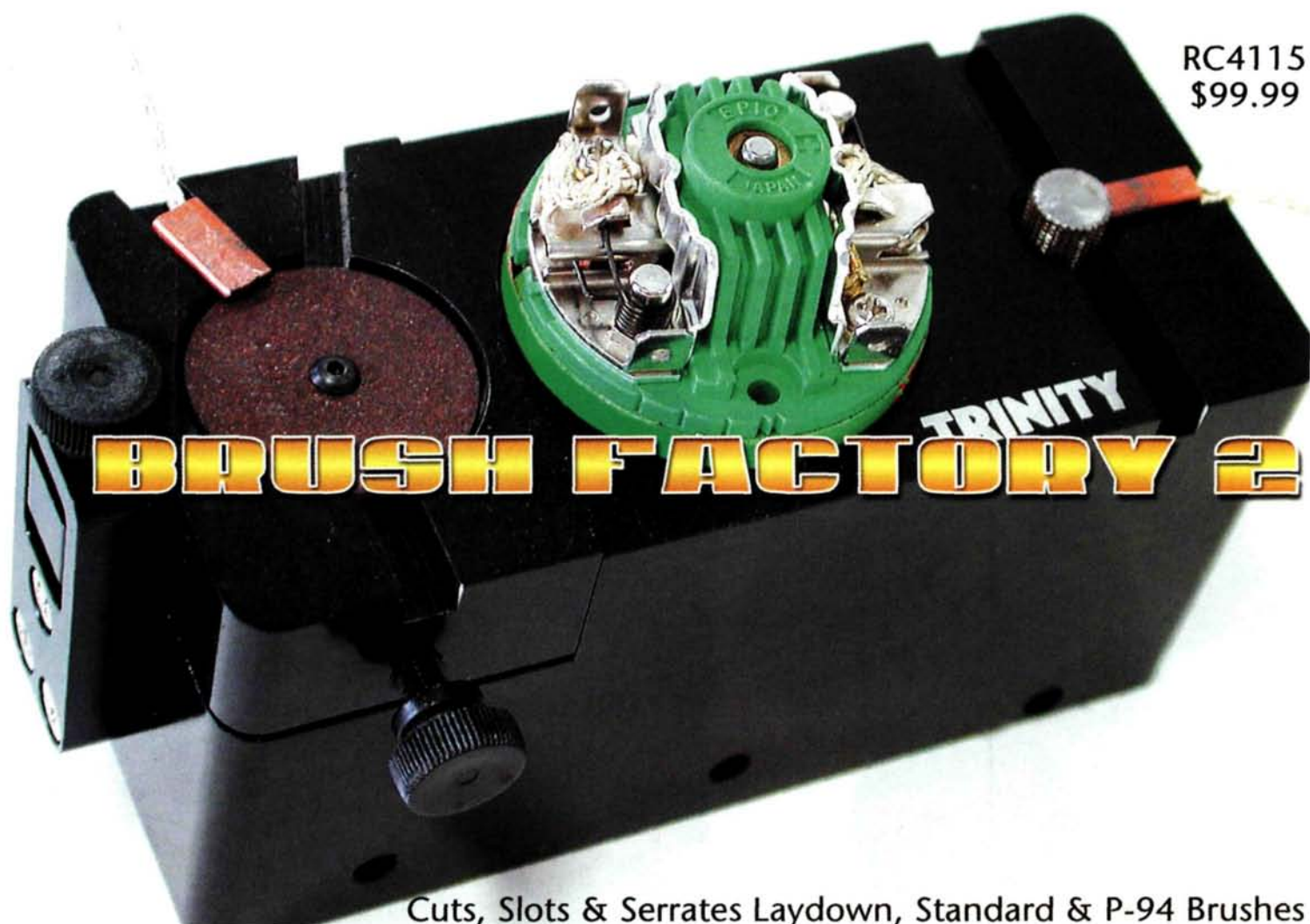


**Mix It Up**

### XTM Racing R-Box

This little box of electronic magic is pretty cool; basically, it gives you the ability to operate a third servo with any 2-channel radio system and allows you to install a 2-channel in a T-Maxx without losing the reverse function. The R-Box plugs into your receiver's throttle channel, and your throttle channel is then plugged into the R-Box. Now you can plug the reverse servo into the R-Box, which "mixes" the signal so the third servo is controlled by the throttle channel. The R-Box is adjustable; you can set the precise point in the throttle servo's travel at which the third servo will be activated.

XTM Racing; distributed by Global Hobby Distributors (714) 964-0827; globalhobby.com.



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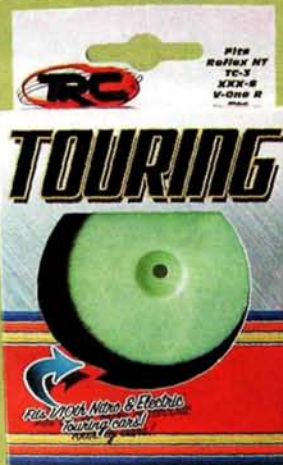


## TRC touring tires

TRC has been in the sedan-foam game for years, but it recently reformulated its compounds and

revamped the sizing to suit the needs of today's high-performance nitro and electric cars. Along with new-style dish wheels, a proprietary gluing process and new box packaging, the TRC rubber features a wider footprint (30mm) for rear-tire applications and special "front only" compounds that have the same shore ratings as the standard compounds but a different "cell structure." TRC claims the new foam is ideally suited to front-end duty.

TRC (732) 635-1600;  
teamtrinity.com.



## it's matt's bag, baby

### MATT FRANCIS RC Limited Edition transmitter bag

Remember when you were the only guy at the track with a transmitter bag? Now everybody's got 'em. So, if you want to retain your cool-guy status, you've got to step it up, and this is the bag to do it. You'll blow away basic black with this screaming-red, Matt Francis-inspired bag, which commemorates Matt's 2002 IFMAR Off-Road 2WD World Champion title. The limited-edition bags are numbered for authenticity, feature extra pockets for crystals and modules and include an ID tag for your name and address. Even if your driving skills are closer to those of Francis the Talking Mule than Matt Francis', there's no reason not to be stylish.

Matt Francis RC by Trinity Products  
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TRINITY



## IT'S ALL IN THE BOX!

**HPI Sprint** The Savage is the biggest news out of HPI, but it isn't the company's only new kit! The Sprint, which has been available for a while in Japan, will soon be available in the States. The electric sedan includes installed electronics (with ESC), an AC charger, a stick pack and a mounted Porsche body with factory-applied decals. Now that's what I call ready to run! The Sprint isn't short on tech features, either; see for yourself:

- > Dual-belt, gear-diff drive train.
- > Airtronics-built TX-2 radio gear.
- > Nosram ESC.
- > Saturn 20-turn motor.
- > 14 ball bearings throughout the car to maximize battery life.
- > Lots of purple-anodized alloy components.
- > Adjustable body posts to fit many bodies.

HPI Racing (949) 753-1099; [hpiracing.com](http://hpiracing.com).



## What's the H.A.R.M.?

**H.A.R.M.**  
1/5-scale RTRs

Getting into big-scale RC just got easier, now that Horizon is carrying the H.A.R.M. line of German-built 1/5-scale cars. In addition to impressive hugeness and heft (3 feet long and about 20 pounds), the H.A.R.M. cars feature 23cc Solo gasoline engines and are sold completely RTR; you get an installed JR RX3 FM radio set, and the polycarbonate body is professionally painted—all you need to do is apply the decals. Three body styles are available: Mercedes CLK-DTM, Opel DTM and an "Outlaw" street truck design.

H.A.R.M. cars; distributed by Horizon Hobby  
(800) 338-4639; [horizonhobby.com](http://horizonhobby.com).



## Turning the tables

### HOBBICO Model Maker rotating display table

Hobbico's rotating stand is aimed at the static-model crowd, but your Mini-Z or Micro RS4 sure would look good parked up there, wouldn't it? There's a black velvet inlay in the center, and slots at each corner for signage, if you're into that sort of thing. A switch in the base turns the unit on and off, and Hobbico says a D-size alkaline battery (not included) provides enough power to keep the table turning for hundreds of hours.

Hobbico/Great Planes Models Distributors  
(800) 637-7660; [hobbico.com](http://hobbico.com).



## Tires with SOLE

### TEAM ORION Fresh Kicks tires

Is it just me, or is the truck-tire market exploding? Team Orion is the latest to jump into the rubber wars with its Fresh Kicks line which includes tires for Maxx-size wheels and 2.2 inch wheels. Six new tread designs are available, each in two compounds: Long Life, which could be called "medium" softness, and "Pro," a soft racing-rubber compound. The tires can be purchased unmounted, or you can opt for the factory-glued treatment and get Team Orion's Revolver wheels. These are just three of the new designs (top to bottom): Meathook, Dominator and Redneck. Team Orion Inc. (714) 694-2812; [team-orion.com](http://team-orion.com).





## PROTOFORM Dodge Stratus 2.0

According to Protoform, this retooled 190mm Stratus shell isn't just about good looks—although that area is obviously well covered. Designed for "balanced, neutral handling and fast straightaway speeds," the Status 2.0 conforms to IFMAR and ROAR specs and includes a decal sheet, window masks and mounting hardware for the included bi-level wing. Made to fit all 190mm sedan chassis. Protoform Inc.; distributed by Pro-Line (909) 849-9781; [pro-lineracing.com](http://pro-lineracing.com).



# DODGE REDUX

## Quiet down and stay in line!



## DYNAMITE Quiet Pipes and Omega in-line exhaust systems

Omega's in-line pipes all include spring-coupled manifolds to eliminate mid-race exhaust blowouts and prevent changes in engine tune due to pipe slip, but the best feature is that polished finish—if you're gonna go fast, your car should look fast, right? You can get the Omega pipes to fit all on- and off-road .21 engines, as well as rear-exhaust .12 engines.

Race pipes usually accompany high-performance with a high-volume exhaust note, which might not make you the neighborhood favorite. Dynamite's Quiet Pipes can help; according to

Dynamite, the pipes are 33 percent quieter than similar tuned pipes, yet still deliver the performance you buy a tuned pipe for. The Quiet Pipe

includes a spring-coupled manifold and is offered to fit side-exhaust and rear-exhaust small-block engines. You can get the rear-exhaust model in black or polished finishes, or black only, if you opt for the side-exhaust model.

Dynamite and Omega; distributed Horizon Hobby (800) 338-4639; [horizonhobby.com](http://horizonhobby.com).

## AWESOME ALFA

### TEAM LOSI Alfa 156 GTA body set

There's no mistaking an Alfa for any other make when you see that triangular grill coming at you, so you're sure to stand out from the sea of Stratus shells when you hit the track. Losi's new Alfa 156 is the body to separate you from the crowd, but it's more than just good-looking; its profile has been massaged for aerodynamic balance, and the wing is equipped with extra-large "wickers" (the side-dam-like vanes in the middle of the wing) for more downforce. The 190mm Alfa shell fits all electric touring cars, and window masks and decals are included.

Team Losi; distributed by Horizon Hobby Inc. (800) 338-4639; [teamlosi.com](http://teamlosi.com); [horizonhobby.com](http://horizonhobby.com).



## RPM Bumpers

If your driving style is closer to bumper-cars than racing cars, you

need to bolt one of these onto the front of your ride. RPM has always been the bumper king and shows no signs of abdicating the throne with these new releases. Extra-tough wall-smackers are now available for Associated's TC3 (nitro and electric) and RC10GT, as well as the Team Losi Triple-X series. All the bumpers have clever skid rails on their undersides, and RPM guarantees the bumpers to be unbreakable.

RPM R/C Products (909) 393-0366; [rpmrcproducts.com](http://rpmrcproducts.com).

# Bumper Crop



# readers' rides

YOUR BEST BUILDS



## JASON ANSTETT WHITE CITY, OR TRAXXAS RUSTLER

Here's a wild-looking stadium truck from the great Northwest: the Rustler's multi-scheme paintwork is credited to J. A. Custom Bodies. Jason uses a Team Orion Core motor for power and an LRP SR speed control.



## JON FARIS, RIPLEY, OH HPI RS4 MT AND BART'S PARTS RC10 SPRINTER

Ripley, OH, is the home of River Rat Raceway, and this RC10 sprint car with Bart's Parts conversion was the Outlaw class 2001 track champion. Aside from driving skill, Jon powered his way to victory using a Novarossi-engine-equipped CVEC pipe. The racer is equipped with KO Propo electronics.



## BRETT WALDENMAYER EFFORT, PA HPI NITRO MT RTR

It's nice to see this HPI Nitro MT in its natural habitat. Brett's truck began as a ready-to-run, but he made quite a few upgrades. He switched the stock body for this good-looking HPI Dodge Ram, added lots of aluminum components, an O.S. .12 CV engine with CEN cooling head and a tuned pipe. Next, Brett's looking into a .21 conversion kit.



**READERS'  
RIDE  
OF THE  
MONTH**

I'm sure you'll agree that Jon's racer and tow rig deserve to be featured together as our Reader's Ride(s) of the month. The tow rig is an HPI Nitro MT with a Pro-Line Silverado body. The truck has the same engine and radio setup as the sprint car and more than enough power to haul the custom-built aluminum trailer. The tow platform has RPM wheels and Pro-Line rubber, and Jon mentions that when the track is slick, the hauler is actually faster than the race car.

## WIN A ONE-YEAR SUBSCRIPTION TO RADIO CONTROL CAR ACTION MAGAZINE!

Send a sharp, uncluttered, well-exposed color photo of your vehicle (no Polaroids) and a brief description to "Readers' Rides," *RC Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. If we publish your photo, you'll receive a free, one-year subscription to *RC Car Action* and will be eligible to win the "Reader's Ride of the Year Contest." Write your address and phone number on your letter and on the back of every photo you send. Good luck!



**DONN PARTRIDGE**  
JUPITER, FL  
**TRAXXAS E-MAXX**

This shot of Donn's E-Maxx is a perfect example of what we're always looking for; it's perfectly framed, sharply focused and really shows off the truck well. The E-Maxx is equipped with Trinity Monster Maxx motors and a wheelie bar, Imex Jumbo tires, Ram off-road lights, Sanyo 2400 batteries and a hot-looking Pro-Line Ford Excursion body.



**DENNIS EMERSON**  
RIVERSIDE, CA  
**TEAM LOSI TRIPLE-XS**

Dennis put together a great package with this Losi Triple-XS. The chassis and shock towers are graphite, and the car has a Peak Nebula 12x2 motor, a Novak C2 speed control and an HPI Stratus body. The metallic yellow, red and black colors create an excellent race scheme that makes the whole car look like a winner.





**ANDREW BANIA**  
**MAPLE HEIGHTS, OH**  
**TAMIYA WILD WILLY 2**

Who doesn't have a soft spot in his RC heart for Wild Willy? Tamiya's beloved jeep is shown here on patrol, keeping the residents of Maple Heights, OH, safe from would-be plastic intruders. The truck remains in stock trim, and Andrew uses a Futaba radio system.



**TREY ENGLE**  
**SAN ANTONIO, TX**  
**PARMA PRO '37**

You could say that RC is kind of a drag for Trey Engle and his father; they worked together on this killer Parma Funny Car. Beneath the Bolink Pro Stock Camaro body lie eight Awesome 2400mAh batteries, an LRP speed control and a Speed Gems 9x2 motor. The present setup is good for speeds beyond 50mph, but a few more mods are planned for even greater top speed. ■

Congratulations to the Newest World Champions!



**Masami Hirosaka**  
 2002 IFMAR 1/12  
 World Champion  
 Reedy Ti Modified Motor



**Surikarn Chaidejsuriya**  
 2002 IFMAR Touring Car  
 World Champion  
 Reedy Ti Modified Motor

**REEDY**

The Power Behind  
**TWENTY-FOUR IFMAR World Champions!**

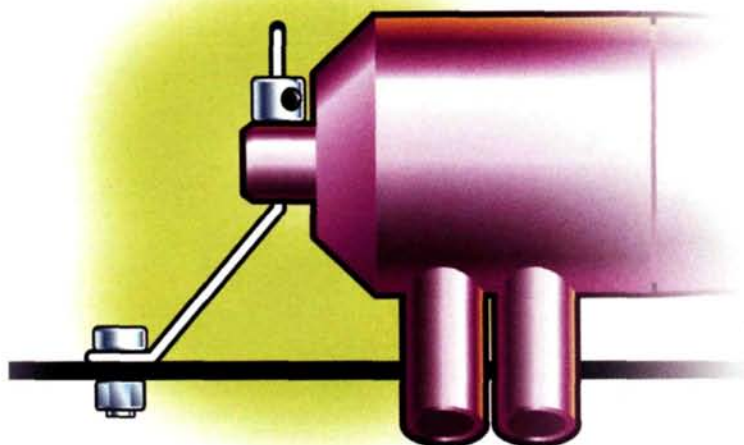
How many World Champions use YOUR brand of motors?



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HINTS, TRICKS, TIPS AND IDEAS FROM READERS LIKE YOU

**EASIER EXHAUST-PIPE REMOVAL**

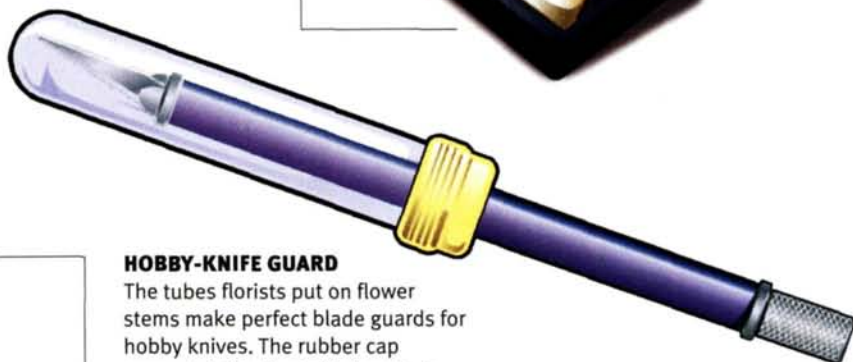
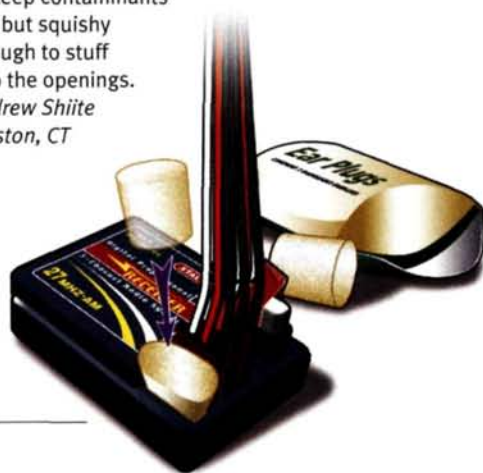
Instead of removing your nitro car's front wheel to gain access to the pipe-mounting screw, try this. Use a wire that's long enough to extend above the pipe, and slide an airplane wheel collar onto it to hold it in place. To remove the pipe, just slide off the collar—no wheel removal required.

Ryan Williams  
Loganville, GA

**RECEIVER DIRT GUARD**

If your car's receiver has any open slots, dirt and liquid may get into it and damage the electronics. The foam material used for earplugs is ideal to plug the open slots. It is dense enough to keep contaminants out but squishy enough to stuff into the openings.

Andrew Shiite  
Weston, CT

**HOBBY-KNIFE GUARD**

The tubes florists put on flower stems make perfect blade guards for hobby knives. The rubber cap securely holds the knife handle to prevent the blade from becoming damaged or accidentally cutting you. The tubes also make excellent containers for small parts.

Carl Shepard  
Newton, MA

**IMPROVED EXHAUST FLOW**

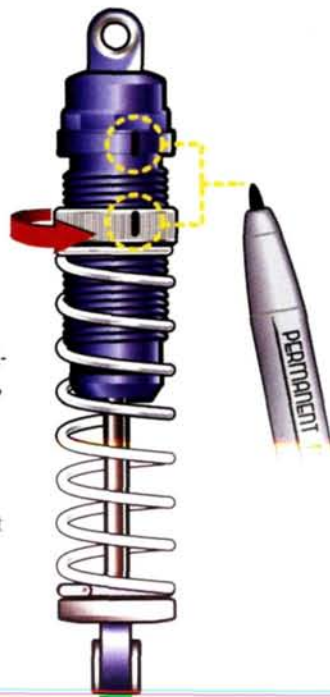
If the opening in your exhaust manifold is smaller than the exhaust-port opening, your engine is not performing as well as it could be. For better exhaust flow, enlarge the manifold opening with a Dremel tool.

Jon Hobart  
Waterford Works, NJ

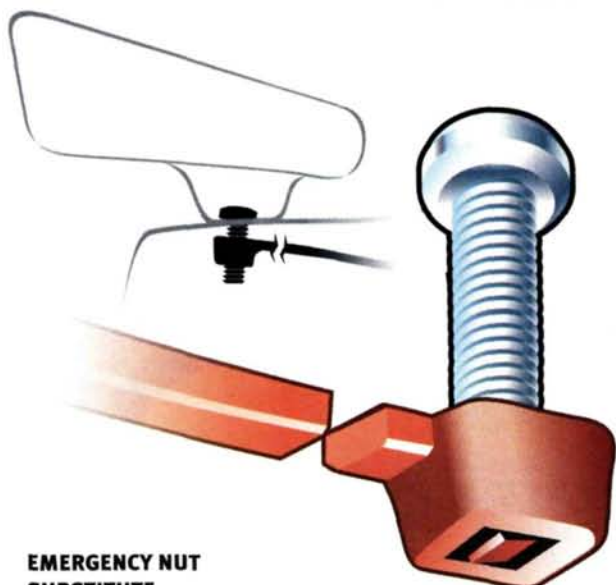
**EASY PRELOAD MEASURING**

Here is an easy way to accurately adjust preload when you use threaded shock bodies. Screw the collar all the way to the top of the shock, and draw a line with a permanent-ink marker from the top of the shock to the collar. Count the number of times the collar goes around, and you will be able to make the same adjustment on the other shocks.

Misha Mlinar  
Winnipeg, Manitoba, Canada







### EMERGENCY NUT SUBSTITUTE

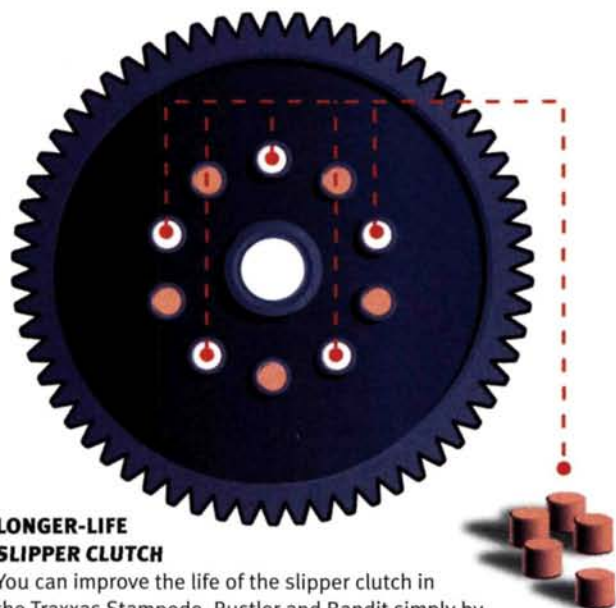
If you lose a nut and don't have a replacement, a zip-tie can often be a good substitute. Simply take the square end of a zip-tie and put it where the nut would go, and use the long end as a handle to position it. Then thread a screw into it; the tab inside the square end will engage the screw's threads. Last, trim off the long end for a neater look.

David Adutch  
Holmes, NY

### FUEL CLEANUP

To get the last drop of fuel out of the tank without spilling it on the chassis, put a wadded piece of paper towel into the fuel-tank opening. Turn the vehicle over, and the remaining fuel will be absorbed by the towel.

Ben Lehman  
Baldwin, WI



### LONGER-LIFE SLIPPER CLUTCH

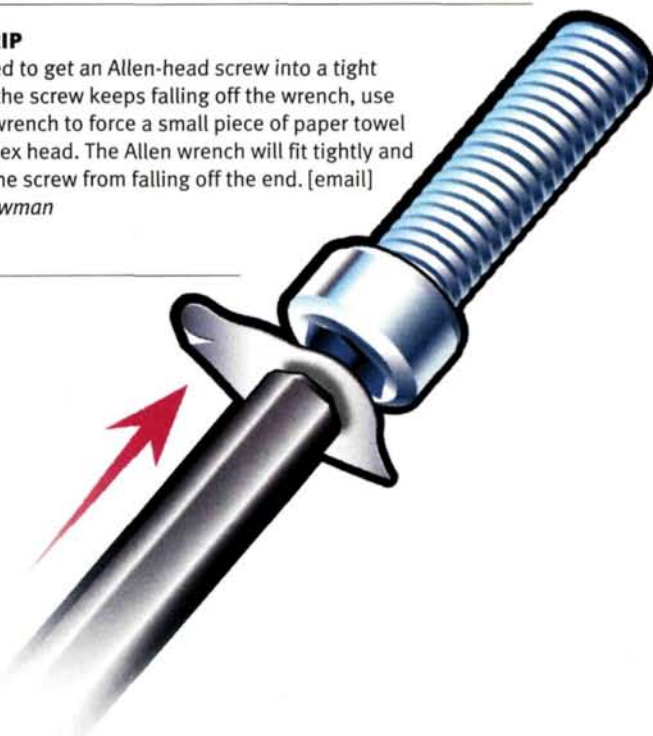
You can improve the life of the slipper clutch in the Traxxas Stampede, Rustler and Bandit simply by buying more friction pegs and inserting them into the empty holes in the spur gear. There's double the contact, and the pegs will wear more slowly.

B.J. Hennessey  
South Bend, IN

### GET A GRIP

If you need to get an Allen-head screw into a tight spot but the screw keeps falling off the wrench, use an Allen wrench to force a small piece of paper towel into the hex head. The Allen wrench will fit tightly and prevent the screw from falling off the end. [email]

Roger Newman



"Pit Tips" are submitted by readers and are screened for functionality, feasibility and safety but are not tested by Radio Control Car Action. Radio Control Car Action and the submitting authors are not responsible for personal injury or damage to models or tools resulting from readers' use of "Pit Tips."

**WIN AN OFNA YO-YO AND RC CAR ACTION SUBSCRIPTION!** Radio Control Car Action will give a 6-month subscription (or extend an existing subscription) and an OFNA Yo-Yo to the author of each idea used in "Pit Tips." The "Top Tip" winners will also be considered for "Tip of the Year" to be selected at the end of each year. The "Tip of the Year" winner will receive an OFNA OB4 International RTR electric car kit. Send a rough sketch to "Pit Tips," c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one nor return unused material.



YOU'VE GOT PROBLEMS? WE'VE GOT FIXES.

**STUBBORN PULL-START MECHANISM**

I own an HPI Super Nitro RS4 RTR that's bone stock, and I have a problem with the pull-starter rope. For some reason, it doesn't rewind back into its housing after I've pulled on it, so I end up with the starter handle in my hand and the rope lying on the engine. I've replaced the pull-starter mechanism, but the problem persists. Is something wrong with my engine? Do you have any advice for me? [email]

Robin X

The same thing happened to me, but with a different engine, and I, too, couldn't figure out what caused the problem. One day, I replaced the pull-starter mechanism and forgot to completely tighten the screws that secured the unit to the engine backplate; the pull-starter worked great until I tightened the screws. I discovered that the mounting screws don't have to be tightened down with torque; just tighten them until you feel a slight resistance, and then stop. For extra security, place a drop of liquid thread-locking compound on the screws. Also, applying beeswax to the pull-starter rope can help the system work more smoothly. Hope these tips help.



Tighten the screws that secure the pull-starter mechanism to the engine, but do not overtighten them. A drop of liquid thread-lock applied to the screws will help ensure that they don't loosen.



Apply beeswax to the pull-starter rope to help keep the pull-starter mechanism working smoothly.

**REAL PERFORMANCE PRODUCTS!****Traxxas Lightened Spur And Double-Disc™ Slipper Kits**

RRP's NEW line of Lightened Spur and Double-Disc Slipper Kits for Traxxas Nitro and T/E-Maxx trucks are designed to improve performance and increase reliability. This combo incorporates a machined steel or Super-Tough plastic spur, a Vented Aluminum Clutch-Plate/Gear Adaptor (small or large), 2 Slipper Pads and 2 Plates to deliver the adjustability you need and the increased performance that you demand. **Complete Slipper Kits** are available in the following sizes: RRP 8166 Slipper Kit with 66T Super-Tough plastic spur (Stock Size) for E-Maxx RRP 8172 Slipper Kit with 72T Super-Tough plastic spur for Traxxas Nitro RRP 8465 Slipper Kit with 65T Steel Spur for Traxxas Nitro RRP 8472 Slipper Kit with 72T Steel Spur (Stock Size) for T-Maxx. Spurs, Clutch-Plate/Gear Adaptor and Slipper Pads also sold separately.

**Nitro and T/E-Maxx Accessory Spurs**

A wide range of spurs fit our Double-Disc Slipper Kits. Choose from machined Super-Tough plastic spurs in 66, 68, 70, 72 and 76T sizes, RRP 82XX, or CNC machined steel spurs available in 65, 72 and 76T sizes, RRP 83XX. Small Clutch Plate/Gear Adaptor fits 65 thru 70T spurs. Large Clutch Plate/Gear Adaptor fits 72 thru 76T spurs.

**Traxxas Nitro Hardened Steel Clutchbells**

CNC Machined from solid steel these bells are built to last. They take the 5x11 bearing (NOT included). Available in 19T, RRP 8119, 20T RRP 8120, 21T RRP 8121 and 23T RRP 8123.

**48P Absolute Series Pinions**

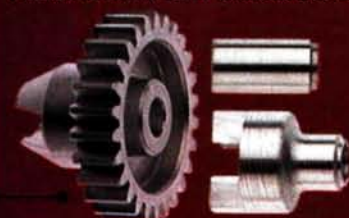
Super hard, lightened and cut with unmatched precision. Great with any spur, but with an Absolute spur, even on-off noise is gone! Available in 48P in 16T thru 28T sizes. RRP 1416 - RRP 1428.

**48P / 64P SuperLite Aluminum Pinions**

They're lightened, hard coated and precision cut. Available in 48P in 16T thru 28T, and 64P in 24T thru 38T. RRP 30XX (48P) and RRP 31XX (64P). Only \$5.25.

**48P Hard Nickel Plated Steel Pinions**

These precision cut gears have an extremely hard coating that makes them really last. Available in 12T thru 35T. RRP 1012 - RRP 1035.

**T-Maxx Forward ONLY Hardened Gear Kit**

This kit contains a 26T hardened aluminum output gear, a forward drive hub adaptor and spacer. RRP 8585.

**T-Maxx Hardened Forward Primary Gear**

Machined from solid aluminum and hard coated. A direct replacement for the stock gear. RRP 8528.

**Make No Compromises.**

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## GLITCH GREMLINS IN MY RTR

I have a problem with my Team Associated RC10GT RTR's servos. The steering and throttle servos work fine when the engine isn't running, but the moment I crank the engine over, the servos glitch like crazy. Over time, the throttle-servo glitching has worsened; it repeatedly opens the carb fully for just a moment and then quickly closes it completely. Sometimes, this happens when I squeeze the throttle trigger.

I've installed new servos, and the problem has continued. I've also taken the advice of the folks at my local hobby shop and made sure that the antenna isn't rubbing the chassis, but the servos still glitch. If you have any advice, I would greatly appreciate it. [email]

David Weinhold



Install heat-shrink tubing over the piano-wire linkage to eliminate the metal-to-metal contact and thus reduce the chance of glitching.

First, install new batteries in your transmitter and 4-cell battery holder.

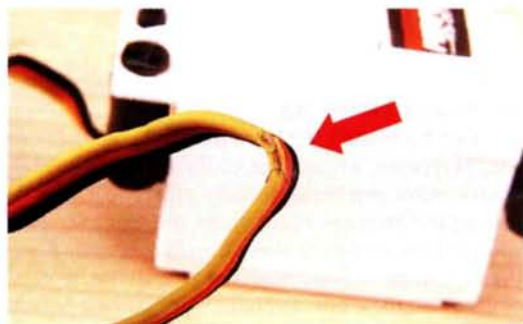
Glitching is often caused by something as simple as having low batteries in the transmitter or onboard receiver pack.

Next, check your electrical wiring for damaged insulation. A small piece of exposed wire can cause all sorts of glitching problems. Frays and cracks in the wires can be covered with heat-shrink tubing or liquid electrical tape. Also, check all of the screws that thread into metal, and be sure that they are tight. Engine vibration can loosen screws and cause them to rub against

metal, and that can lead to glitching; use liquid thread-lock on all the metal-to-metal connections.

Connect the onboard battery pack directly to the battery plug on the receiver. The on/off switch can get dirty, and that can cause glitching; sometimes, the metal, piano-wire throttle linkage can cause problems if it comes into contact with the eyelet on the metal brake lever, or the metal return spring could be vibrating on the piano-wire linkage. To prevent metal-to-metal contact, run a thin piece of heat-shrink tubing around the throttle linkage.

If none of these tips helps you, your receiver or a bad frequency crystal could be the cause of your glitching. If that's the case, install a different crystal or a different receiver. Maybe your hobby shop or a friend can lend you these items to help you troubleshoot your problem.



A small crack or fray on the wire insulation will surely cause glitching problems. To insulate the wire, you can re-solder it and install a piece of heat-shrink tubing over the repair. If the exposed wire is in good shape, applying a drop of liquid electric tape or silicone glue will also do the trick.

## NEW T-Maxx Steel Diff Gear Set



T-Maxx / E-Maxx differential gear set, includes: 1 beveled pinion gear, 1 beveled spur gear, 4 re-usable stainless steel Phillips head screws, 1 tube Associated Black Grease, and a shim kit for spider gears with 10 .003" shims. 2 sets needed per truck. RRP \$590

## NEW T-Maxx Aluminum High Performance Brake Kit



New, lightweight aluminum high performance brake kit, includes bigger, more aggressive brake pads and steel backing plates. One piece vented rotor minimizes side-to-side wobble. RRP \$560

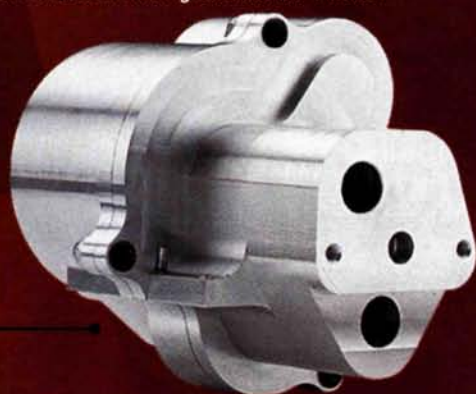
[www.robinsonracing.com](http://www.robinsonracing.com)

## T-Maxx Vented Flywheels



Aluminum vented flywheels move air over clutch bell, improving performance and cooling. RRP \$551 Blue, RRP \$550 Natural Silver

## Forward ONLY Racing Gearbox For T-Maxx



Precision CNC machined from aircraft grade billet aluminum this Forward ONLY Racing Gearbox will give your T-Maxx a serious competitive edge. RRP \$595



## ROBINSON RACING PRODUCTS

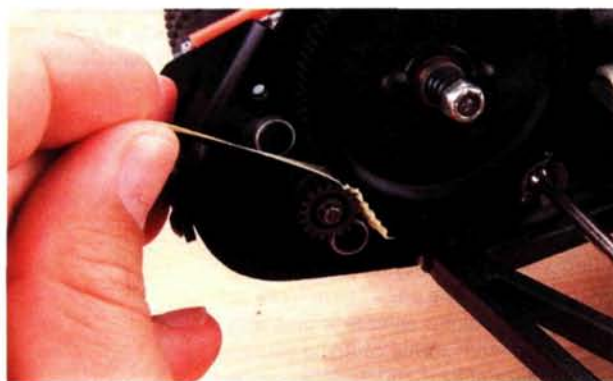
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## SPUR-GEAR-EATING TC3

My Team Associated TC3 has a Novak Cyclone 2 ESC, a Novak XXL FM receiver, a Hitec Lynx 3D transmitter, a Reedy 8-turn double motor and Trinity 3000 HV cells, and it goes through spur gears like water. For example, the spur gear usually strips when I hit the brakes to slow down to make a sharp turn, but I've also stripped gears when I've pegged the throttle. I've also noticed that the motor and battery are burning hot after I've driven the car for only a few minutes. What gives? [email]

Dan Evanitchi



It's easy to adjust the gear mesh. Just feed a small strip of paper between the pinion and spur gears and tighten the motor-mounting screw. Remove the paper, and the gears will mesh perfectly. An RC10T3 is shown here, but the technique is good for any car.



It's always a good idea to have several sizes of pinion and spur gears in your toolbox so that you'll be able to find the right gear for the type of motor you run and the size of the track that you race on. If your motor and batteries run hot, gear down to a smaller pinion gear; try again after the electronics have cooled.

That's a lot of motor for a TC3, Dan. It can handle low-turn motors, but you must be sure to gear it correctly, or your motor, battery pack and ESC could overheat and possibly be damaged. It's also important to set the gear mesh between the pinion and spur gear correctly, or you'll have stripping problems. The TC3's gearing chart provides advice for motors that range from 27 turns to 9 turns. It recommends that the stock 72-tooth spur gear and a 19-tooth pinion be used when running 9-turn motors. Because you run an 8-turn motor, a 17- or 18-tooth pinion gear meshed with the stock (72T) spur gear should provide the proper gearing, but you'll still need to let your electronics cool down between runs.

You can check your pinion- and spur-gear mesh by loosening the motor-mounting screw, sliding the motor over until there's a slight gap between the gears and then simply feeding a thin piece of paper between the two gears. Close the gap between the gears, tighten the motor-mounting screw and remove the paper. Your car will now have the proper pinion- and spur-gear mesh.

### RS4 Nitro Aluminum Brake Kit



Lightweight aluminum, variable braking system. RRP 1575

### RS4 Nitro Vented Flywheel



Aluminum vented flywheels move air over clutch bell, improving performance and cooling. RRP 1570 RRP 1571 Pull Start

### Stealth Sedan Spurs



These precision machined spur gears are super quiet. They're available in 48P in 60T thru 96T sizes, and fit any HPI electric car or truck. RRP 1860 thru RRP 1896.

### RS4 Nitro Small Aluminum Drive Pulleys



Hardened drive pulleys, sold in pairs. RRP 1538

### RS4 Top Shaft Pulley



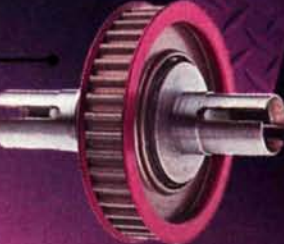
One piece pulley and shaft are precision cut and hard anodized. Purple anodized side flanges are pressed on. RRP 1527

### RS4 / Pro / Pro2 / Nitro Aluminum Outdrives



40% lighter than stock ball diff outdrives. RRP 1585

### RS4 Complete Ball Diff Units



Hardened steel outdrives, ground and polished thrust washers, 2.5x8mm ball bearings, and aluminum pulley. RRP 1590 Electric RRP 1595 Nitro

### RS4 Diff Pulleys



Precision machined, hard anodized aluminum diff pulleys. RRP 1539 nitro sedans RRP 1528 electric sedans

### RS4 Nitro Lightened Gear Adapter



This lightened gear adapter includes a machined nylon spur that's tougher than the stock gear and will last longer. RRP 1535

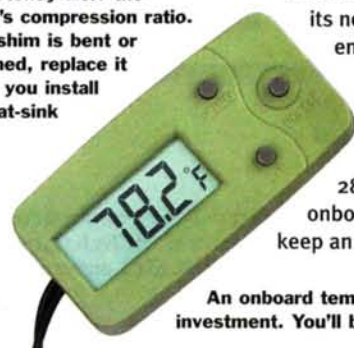
[www.robinsonracing.com](http://www.robinsonracing.com)

RS4 Nitro 32 Pitch Conversion Kit is available. RRP 1536





The HPI .15 FE comes with one head shim installed between the piston sleeve and cylinder head. Remember to transfer this shim to the new heat-sink head, or you'll inadvertently alter the engine's compression ratio. If the shim is bent or deformed, replace it before you install the heat-sink head.



An onboard temp gauge, such as this one from Venom is a wise investment. You'll be able to tune your engine without guesswork.

## HOPPING UP TO RUN MORE SLOWLY

I own an HPI Nitro RS4 2 and recently took it apart to clean it. When I put it back together, I installed a new heat-sink head, a tuned pipe and manifold and front and center belt tensioners. Now, the car doesn't run as fast as it did before, and the 2-speed won't shift anymore. I've readjusted everything, but nothing has worked. I'm completely stumped. [email]  
Justin Cowan

Did you remember to install a head shim under the new heat-sink head?

The stock head shim might have been left on the cylinder head that you replaced. If all is fine in the head-shim department, then you should slightly lean out the carburetor's high-speed needle valve. With the tuned pipe, your engine now exhales with less restriction, and that means it runs cooler. It's possible that your engine hasn't reached its new running temperature and isn't revving high enough to engage the tranny's shift point. But don't overdo it; you don't want to lean the engine too much and risk damaging it by overheating it. Normal engine operating temperatures for the stock HPI .15 FE engine are between 240 and 280 degrees F. MIP and Venom Racing offer onboard engine-temperature gauges that can help you keep an eye on temperature. ■

## TOOLBOX

### RPM SMALL PARTS TRAY

RPM's molded-plastic Small Parts Tray has a ribbed bottom that makes it easier to pick up parts. A small round magnet built into the tray is great for holding E-clips on their edges so they are easier to grab.

Item no. 70100; \$1.95  
RPM RC Products  
(909) 393-0366;  
rpmproducts.com.



### NEED HELP?

Send your "Troubleshooting" questions and comments to George M. Gonzalez, [georgeg@airage.com](mailto:georgeg@airage.com).

### RC10-GT Steel Combo



Precision machined from solid steel, then hardened, this 65T spur and 15T bell combo will last and last. The extra-hardened clutch bell fits ALL Associated and MIP shoes. RRP 2365

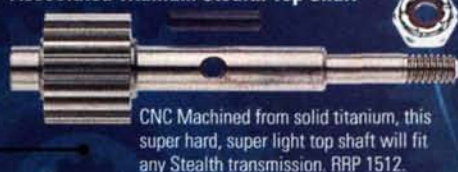
[www.robinsonracing.com](http://www.robinsonracing.com)

### Hardened Steel Idler Gear



Cut from solid steel stock, this gear is lightened and hardened for super quiet precision and extra long life. Jammin' tranny grease is included. RRP 2213 RC10-GT, RRP 7505 Ultima GP-R

### Associated Titanium Stealth Top Shaft



CNC Machined from solid titanium, this super hard, super light top shaft will fit any Stealth transmission. RRP 1512.

### Hardened Diff Gear



Hard anodized, precision CNC machined aluminum diff gear. RRP 1513 RC10-GT RRP 7500 Ultima GP/EP-R

### Blue Lightened Slipper Kit



The rear plate is hard anodized and the front plate is color treated. The front plate holds the pad forcing it to slip on the rear plate. When pad wears, just flip it over for a new surface. RRP 1515 Associated, RRP 7515 Kyosho Ultima

### Aluminum Outdrives



40% lighter than stock ball diff outdrives. RRP 1475 TC3, RRP 1502 B3/T3

### TC3 Ultra 48 Pitch Spurs

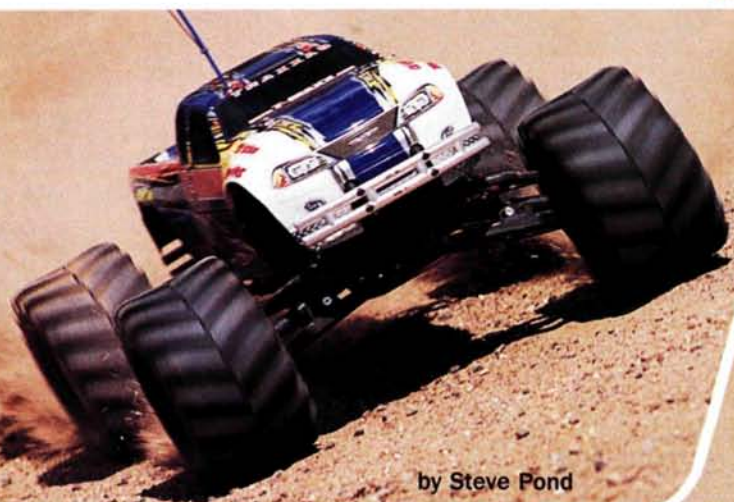


Precision machined from heat-resistant plastic, these spurs mesh flawlessly with our pinions. Available in even numbers from 70T thru 80T, RRP 1670 RRP 1680.

## ROBINSON RACING PRODUCTS

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by Steve Pond

**I**T'S HARD TO BELIEVE that almost three years have passed since Traxxas redefined the world of nitro-powered monster trucks with the introduction of the T-Maxx. Its plush, 8-shock independent suspension, massive ground clearance, 2-speed reversing transmission and electric-start, .15 engine quickly earned the T-Maxx unprecedented popularity. The truck has spawned more than 130 fan websites and at least 70 aftermarket companies that create accessories for it. It even has its own racing class! Not even Traxxas could have predicted the passionate, nearly cult-like following that the truck would capture—or the tide of new trucks looking to steal its thunder. In an effort to maintain its command of the market, Traxxas has performed a major overhaul of the T-Maxx. This new Maxx promises greater power, speed, agility and strength; let's see whether the Traxxas team pulled it off.

# Traxxas TRX 2.5 T-Maxx





**>> BIGGER,  
FASTER,  
WIDER,  
BETTER!**



PHOTOS BY WALTER SIDAS





The Maxx's extended-cab body is finished with distinctive new six-color graphics. There are four versions of the new graphics, swapping out the primary colors amongst red, blue, green and black.

## DRIVING THE NEW T-MAXX

**THE POWER** of the new 2.5 is something you need to experience. The engine pulls extremely well from idle speed and can lift the T-Maxx's front end into a wheelie at will. The engine also pulls well through the mid- and well into the upper-range reaches of rpm, clocking in at an estimated 40,000-plus rpm during our preliminary speed runs at more than 40mph. What's more interesting is that the final drive ratio hasn't changed, and this means that the TRX 2.5 engine adds more than 10mph to the old T-Maxx's top speed purely by virtue of its greater rpm. The engine is very impressive, and not just as an RTR engine; compared with any small-block engine, the TRX 2.5 produces impressive power.

The new Maxx is certainly faster, and it handles better than the original as well. The stock suspension setting is very similar to that of the original Maxx. It has lots of cushy suspension, and is well suited to clearing obstacles. The greatest benefit of the new suspension design is in cornering. The added width improves stability, especially when it's set up with its shocks in the outer, lower shock-mounting positions. With



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NEW T-MAXX ACTION VIDEO!

this geometry, the Maxx has a lower stance and greater roll resistance. Add to this the

range of front caster angle settings, and you have a package that's a more balanced compromise between bump handling and cornering.



# GO WIDE!

## » Maxx chassis and suspension mods

**MUCH OF THE FOCUS** of the new Maxx is on the engine, but a number of notable changes have also been made to the chassis and suspension. Here are the key non-engine-related upgrades.

■ **WIDE-TRACK SUSPENSION.** New suspension arms widen the track of the Maxx by more than 1 inch for more stability through turns. The soft, deep suspension travel of the original Maxx is still there, but new, stronger shock towers provide extra shock-mounting positions for increased tuning options. Three upper and four lower shock-mounting holes are available. The four mounting options in the lower suspension arms are grouped into pairs—one pair for higher ground clearance and more suspension travel, and the other for a lower stance and improved cornering ability.

In addition to the new geometry, the suspension arms have undergone some other changes to accommodate the new configuration. The lower arms are much beefier to handle the extra stress of the increased width. The upper arms have larger holes through which the shocks pass to accommodate the increased number of shock-mounting positions.

■ **CASTER ADJUSTMENT.** Front caster is now adjustable by repositioning the upper suspension arms on their hinge pins. Three caster angles can be selected by changing the order of the clips that position the arms on the hinge pins, thereby making it easy to dial in greater stability or responsiveness to suit your track and driving styles.

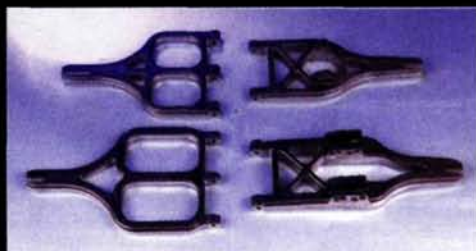
■ **3.5MM STEEL TURNBUCKLES.** To better resist bending, the turnbuckles' diameter has been increased to 3.5mm. Most notable, however, is that they're now designed to have the rod ends threaded on until they bottom out—a simple new method to ensure proper length during assembly and maintenance. Similarly, if you thread the suspension pivots in until they bottom out, you'll automatically get the recommended camber settings.

■ **LARGER-DIAMETER, HEAVY-DUTY DRIVE SHAFTS.** The inner hole of the splined portion of the drive shaft has been closed down even further, and the other dimensions have been increased; the joints are larger, and the pins that form the U-joints have been increased to 3mm—all to form a much stronger drive shaft to handle the extra power of the 2.5 engine.

■ **3MM ALUMINUM CHASSIS.** The new Maxx's chassis plate is 33 percent thicker for 70 percent more torsional rigidity and 50 percent more strength in resisting front-to-rear flex. The new chassis can be retrofitted to the original T-Maxx without modification.



The new suspension configuration includes longer arms for more than 1 inch of added track width. A number of optional shock-mounting positions are available, and that's the reason for the larger holes in the upper arms; they allow a variety of shock-mounting positions without allowing the shock to interfere with upper-arm movement. Note the larger 3.5mm steel turnbuckles; their larger size makes them stronger and more crash-resistant.



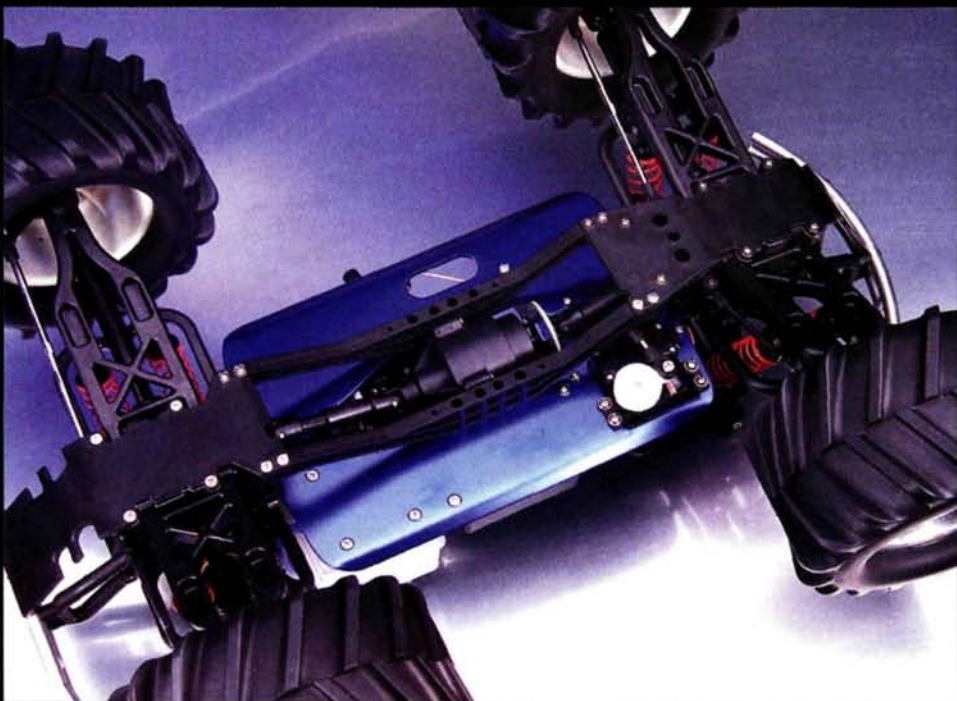
The differences between the old (top, left and right) and new suspension arms is quite clear when they're compared side by side. The lower arms are also visibly much beefier than the originals.



The front suspension arms have caster clips for 4, 7 and 10 degrees of caster angle. This is just one of a few steps taken to make the T-Maxx more adjustable for better handling.



Thicker, stronger drive shafts (foreground) have been installed throughout the truck. These are designed to withstand the extra power of the new 2.5 engine without twisting. Note the visible difference in size. The hole in the center of the inner (male) drive shafts is also smaller, and this further increases strength.



The aluminum chassis plate, which will fit the original version of the truck as well, is now 3mm thick. This makes the chassis 70 percent stiffer in resisting torsional flex and 50 percent stiffer against front-to-rear flexing.



## FIRST DRIVE >>

The TRX 2.5 and its all-new support hardware are the focal points of the next-generation T-Maxx. This engine smashes the mold of the typical RTR engine, using high-quality components to produce incredible power and speed. It's a total package that is unique and likely rivals even the highest performance small blocks.



## Inside the TRX 2.5 Engine >>

**T**raxxas calls the new engine the 2.5—a reference to its displacement expressed in cubic centimeters (cc). In cubic inches (ci), the TRX 2.5 displaces .15, as does the Pro .15 it replaces. Though it may have the same displacement as the original T-Maxx engine, the new 2.5 powerplant is clearly superior in construction and horsepower; Traxxas conservatively estimates a 60 percent increase in horsepower over the Pro .15. Traxxas engineers say the new engine was designed “from air filter to exhaust tip” on the principle that a high-performance .15 engine such as the 2.5 can make the Maxx run with as much or more speed and performance as trucks that are equipped with bigger, heavier engines. Here's how the Traxxas team massaged the engine for maximum output.

■ **HIGH-FLOW “TUNED” AIR FILTER.** The air filter is generally an afterthought for most engine designers, but the “stem-to-stern” engine-design philosophy takes this and every other detail into account. The air filter is a two-stage design that combines a fine-mesh pre-filter with an oiled-foam element. In addition to filtering out all potentially damaging particles, the filter housing itself contributes to the power and efficiency of the engine.

The large portion of the housing features a tapered “venturi-like” design. The hard plastic housing mates

with a flexible rubber coupler that joins it to the engine. The coupler is integrated seamlessly with the large filter housing on one end and with the carburetor on the other, creating a long venturi to properly funnel air into the engine. This maximizes airflow at the same time as it filters the air to preserve the engine.

■ **2-NEEDLE, SLIDE-VALVE CARBURETOR.** The carburetor included with the 2.5 engine is the desirable slide-type that's included with most competition engines. This carb design promotes the greatest possible power output and efficiency with “straight-through” airflow at any throttle position. This carb is constructed of a high-tech composite material instead of aluminum. The composite material greatly limits the power-robbing heat build-up that commonly occurs in aluminum carburetors and can lead to vapor lock and difficulties in starting the engine. It's also lighter than alloy carbs, so it saves a little weight. The carb also features a molded-in “spraybar” that is a first, according to Traxxas. The process of molding the spraybar instead of machining it allows more flexibility in its design; this increases torque and efficiency throughout the engine's entire operating range (in the experience of Traxxas's engineers).

The carb is sealed to the engine block with two rubber O-rings. This ensures greater resistance to air

leaks that can lead to difficult tuning characteristics. One O-ring is installed at the bottom end of the carb, below the clinch assembly, and the other is above—virtually eliminating the possibility of an air leak with a properly installed carb.

The main-needle assembly is threaded into the carb body in a position that's more appropriate for



The EZ-Start backplate even gets into the horsepower act, including some subtle “porting” to assist in smooth air/fuel delivery.



the T-Maxx, but Traxxas smartly added a second main-needle location that is at a 90-degree angle to the original mounting location for applications that require the needle assembly to be moved. The optional needle position is sealed with a threaded aluminum cap when not in use. The threads of the main needle are of a very fine pitch that makes main-needle adjustments less sensitive. A low-speed needle is also included in this 2-needle design, and it features a unique "positive stop" design to prevent damage from overtightening when you "zero-out" the needle for a base-line setting from which the needle can be opened a certain number of turns.

#### ■ INTEGRATED PILOT SHAFT (IPS) CRANKSHAFT.

The crankshaft design may look similar to the "SG" crankshaft that has been optional on other engines for a while, but Traxxas quickly points out that its IPS design is different. Its dimensions are such that it can be used in a short-shaft application such as the T-Maxx, whereas other engines equipped with an SG crank cannot. The function of the IPS crank is similar to that of the SG crank, however, in that it eliminates the potential for runout and vibration that can result from the use of a bolt-on-clutch pilot shaft.



An all-new composite slide carb is included with the TRX 2.5 engine. The carb is sealed to the engine block with two O-rings, ensuring no air leaks in this critical area.

The crank features a large inner diameter that provides for a large induction port while maintaining sufficient wall thickness in the crankshaft for durability. The transitional area where the fuel mixture comes down from the carburetor and into the center induction port is also nicely machined to permit the smooth transfer of the air/fuel charge entering the engine.

■ **MACHINED, KNIFE-EDGED CONNECTING ROD.** Knife edges, oil grooves and high-strength alloys have been used, as expected in a high-performance engine. A few other details concerning the connecting rod, however, deserve a little extra attention. First, the 2.5 uses a long rod. The longer rod reduces the connecting-rod angle throughout the stroke, and that reduces side loads and friction on the piston and increases power. The rod is also light and cleverly eliminates the need for a top-end bushing by having a wider top for more surface area on the wristpin.

#### ■ LIGHTWEIGHT HIGH-PERFORMANCE PISTON.

"Light" is the theme for the reciprocating parts in the 2.5. Unnecessary rotating mass can rob an engine of power, so Traxxas made the piston from a uniquely blended alloy to maximize strength and minimize weight. The piston also has a relief in the skirt to clear the crankshaft, and this also reduces weight. Finally, the wristpin hole in the piston (the wristpin connects the rod and piston) features an offset hole. This design is meant to further reduce piston side loading, which in turn reduces friction and increases power. It's a bit technical, but in the end, it's all part of the optimization process that squeezes as much potential power from the engine as it possibly can.

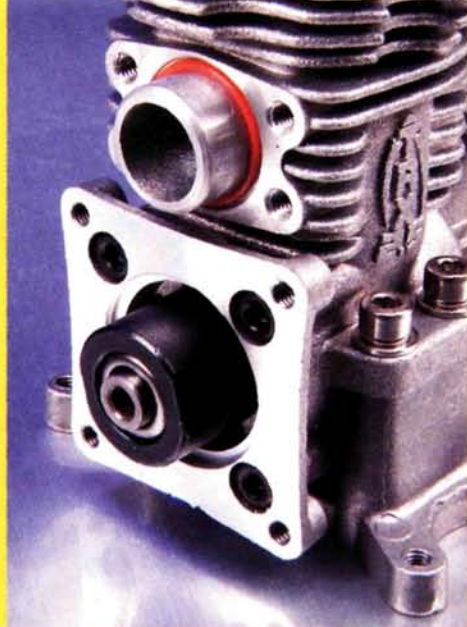
■ **TRUE ABC CONSTRUCTION.** The 2.5's sleeve takes full advantage of current state-of-the-art materials and design. It's a genuine, chrome-plated brass sleeve, but it's more than just a buzzword on a feature list; it's the real deal. The precision-machined brass sleeve features three bona fide intake transfer ports (no bypass ports, and no using the piston as a part of the port) and a nicely contoured exhaust port.

■ **OVERSIZE HEAT-SINK HEAD.** The cast head employed on the 2.5 is unique in a few areas. It's fastened to the engine with five mounting screws instead of the typical four, and it features a molded plastic "protector" that snaps into its top. This plastic ring will take the brunt of any impact from a rollover and can easily be replaced when it starts to show wear. The plastic ring also retains the head screws nicely when you remove the head for maintenance. There's a groove in which the glow-plug wire from the new EZ-Start 2 is routed, so there's no chance of the wire tearing during a rollover.

The large size and shape of the head promote better cooling but also facilitate routine maintenance. Cutouts above the engine-mounting screws match similarly shaped cutouts in the cooling fins of the engine block and make access to the engine-mounting screws much easier.

■ **CUSTOM ENGINE BLOCK.** Like the engine's other parts, the block has been specially designed for the TRX 2.5. It has nicely formed passages for all the transfer ports for smooth transfer of the air/fuel mixture in all areas inside the engine; it even has little "ports" in the backplate to permit a smoother flow of the intake charge. Speaking of the backplate, it's sealed with an O-ring much like the carb, and this should go a long way toward preventing air leaks in this critical area.

The rear exhaust flange is a unique area of the engine block. It's unique because this is Traxxas' first rear-exhaust engine and also because of its flange design. Typical rear-exhaust engines have a common flange, so most headers and gaskets are interchangeable. The 2.5 employs a new twist on the rear-exhaust flange; it doesn't use a conventional gasket but instead uses an O-ring. According to Traxxas, this is done to increase durability; the O-ring, says Traxxas, lasts much longer than the conventional silicone gasket, and replacements are easier to find if a factory replacement is not available at the local hobby shop. The header is also bolted to the engine, and this varies from the conventional spring-mounted header used on conventional rear-exhaust engines. It's designed to be easier to install in original assembly and during later repair and maintenance by the customer.



Traxxas has beefed up the EZ-Start 2's one-way bearing so much that it prefers to call the device a "roller clutch". According to Traxxas, the roller clutch simply will not slip, based on the R&D department's heavy-duty testing.

■ **MAXX-SPECIFIC HEADER AND TUNED PIPE.** As you may have gathered by now, nothing—not even the exhaust system—escaped Traxxas's scrutiny. The header/tuned-pipe combination has been optimized by countless hours of dyno and field testing to ensure maximum performance. The size, shape and length of the pipe have already been tuned for ideal performance across the rpm range. The stock tuned pipe is a one-piece composite design that does not rely on screws to hold it together.

■ **MANUAL MATTERS.** This isn't really an engine feature, but the T-Maxx's new full-color, amply-illustrated instruction book is a vital part of the performance package. Traxxas spared no detail in explaining the proper break-in and tuning techniques that will ensure the TRX 2.5 engine performs its best, and there are even suggestions for tuning the T-Maxx to



The engine innards feature genuine ABC construction using high-quality materials and precision-machining techniques to ensure maximum performance. It delivers.

specific conditions and driving styles. The manual also includes a glossary of terms, to help nitro newcomers speak "the language". Of course, the instructions also precisely cover even the simplest steps required to get the new Maxx from the box to the backyard, so even the complete novice can feel confident about his first run.



## Brent Byers Talks T-Maxx

**HE'S QUICK TO CREDIT** the entire Traxxas team with the creation of the new T-Maxx, but if you had to single out one man as the "guy who designed the T-Maxx," it would be this man: Brent Byers. We sat down with the Maxx maestro to talk about the new truck and its TRX 2.5 powerplant.

**Radio Control Car Action:** The world was expecting a .21-powered truck; why did you choose to develop a state-of-the-art, .15 small-block?

**Brent Byers:** The T-Maxx was designed from the beginning as a 1/10 vehicle that would be powered by small-block engines, and it would

in a Nitro Rustler, they will basically double the power: a 100 percent increase. In a T-Maxx, they get the same level of power, but in that vehicle, it amounts to about a 60 percent increase in performance because of the exhaust configuration. The original T-Maxx's exhaust system was more efficient than the Nitro Rustler's.

**RCCA:** What are Traxxas's plans for making the engine available to the aftermarket; will there be different shaft configurations, starting options, etc.?

**BB:** The plan is to make this engine available to anyone who has any interest in running it, in any application. It's meant to cover every small-block application. We'll cover the entire range that anyone else in the industry covers, as well as some potential .15 big-block applications.

**RCCA:** What was the most difficult or interesting design challenge you had to overcome with the new version of the truck?

**BB:** By far the most difficult challenge with this new version of the T-Maxx was developing a new world class rear exhaust engine and fitting it into the existing chassis dimensions without compromising the engine's performance. The new header design was a big part of that. Second, was creating a brand new state of the art production line for the engine. This included developing a significantly more rigid and precise new set of quality control standards and putting the systems and equipment in place to maintain them during high-volume production. It was no small task.

**RCCA:** The new truck is wider; are there other geometry changes?

**BB:** The truck is wider, and the shock-mounting options are adjusted accordingly, but in addition to those original shock-mounting options, there are many other options that are much more race-oriented for running on race-tracks. The lower suspension arm has a new pair of mounting holes for the shocks that give the truck more roll stiffness and greater stability through corners versus the original holes that were optimized for going over bumps.

**RCCA:** What's next for the Maxx series?

**BB:** Tires and wheels. New tread patterns will be released in a couple of different compounds and with some new inserts as accessories. Like the TRX 2.5 engine, they can be used with the original T-Maxx as well. Your readers can get more info at [traxxas.com](http://traxxas.com).

have been a compromise to install a much larger, heavier engine that would have required the rest of the drive train to be heavier. Our tests proved that the weight of a .21 would preclude any real increase in performance. Therefore, the concept was to design the best small-block .15 available anywhere. We also wanted to build a very competitive, world-class engine that could be dropped into any number of 1/10-scale vehicles.

**RCCA:** Was improving the engine the primary goal in updating the T-Maxx?

**BB:** Yes, but there were many other tiers of design and development. The challenge was to collect all the data on all the areas that could be improved and then to address each one in a way that made sense—both from a manufacturing cost point of view and a reverse compatibility point of view—so that everyone could use the new engine. We increased chassis stiffness to improve the durability of the spur gears and drive shafts.

**RCCA:** Was the TRX 2.5 designed in-house by Traxxas?

**BB:** Completely.

**RCCA:** How much more powerful is the TRX 2.5 than the Pro .15?

**BB:** When someone upgrades to the TRX 2.5



## Pushbutton perfection EZ-Start 2

The team who designed the new EZ-Start 2 electric-starting system was given a simple directive: no failures over the expected life of the engine—period. Here are the most significant design features that have been incorporated into the T-Maxx's new EZ-Start 2.

■ **"SMART" POWER UNIT.** Instead of the old piggyback design, the EZ-Start 2 now features a fully enclosed battery and integrated starter probe to make firing up the TRX 2.5 engine a one-handed task. The new starter also has "smart" circuitry that always provides the glow plug with plenty of juice, no matter what the battery's charge level (unless it's totally dead, of course). This ensures that as long as the battery has enough juice to crank the engine, it also has enough to power the glow plug. A thermal sensor prevents overloads from prolonged starting activity, and indicator LEDs let you know that the glow plug and starter circuits are functioning properly.

■ **SLIP-PROOF "ROLLER CLUTCH".** The one-way bearing in the first-generation starter was prone to eventual contamination from fuel residue, which caused the bearing to slip on the shaft. This disabled the starter until the bearing and starter shaft were replaced. The EZ-start 2's superior one-way bearing (or roller clutch, as Traxxas calls the part) never failed in any way in nearly a year of rigorous testing, according to Traxxas.

■ **IMPROVED GEAR DURABILITY.** An elastomer "cush" device is employed in the EZ-Start's drive train, and it prevents damage to the starter gears by absorbing any overload caused by a flooded engine or other severe loads.

■ **STRONGER STARTER MOTOR.** Stronger magnets and a different, more appropriate armature wind better handle the demands of starting the new engine. ■



An inside view of the EZ-Start 2 shows the new planetary drive gears on the left and the shock-absorbing drive device behind the large gear on the right.

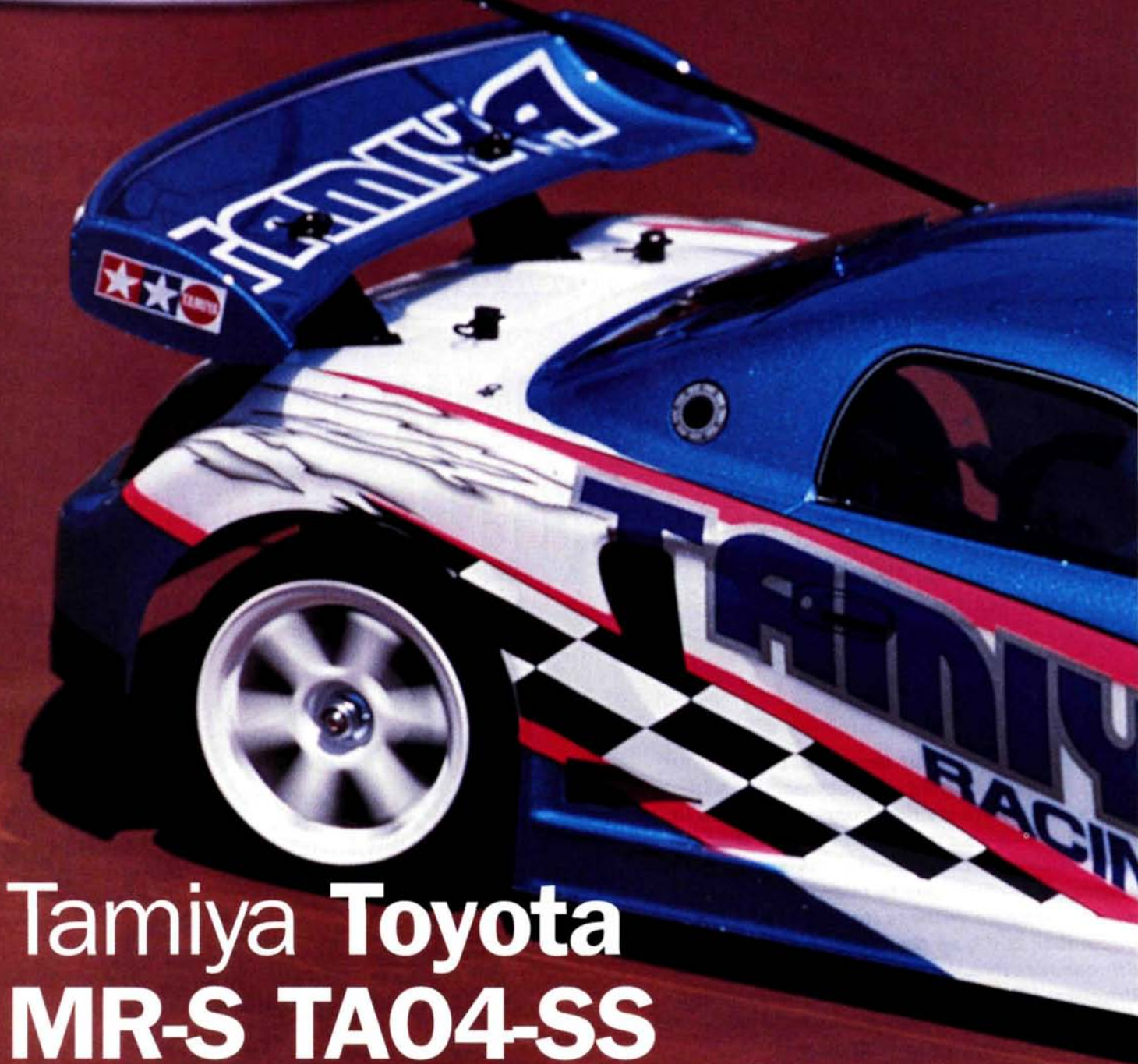
### SOURCE GUIDE

TRAXXAS CORP. (888) 872-9972; [traxxas.com](http://traxxas.com).









# Tamiya Toyota MR-S TA04-SS

**AS THE LEADER IN SCALE RC, TAMIYA HAS A HISTORY** of tweaking its touring car chassis to suit different body subjects. Longtime Tamiya-philies will recall the Nissan 300ZX that Tamiya offered with a TA02-W chassis; the "W" stood for wide, and the car was indeed wider than a standard TA02, just so the Z's body could be authentically proportioned. When Tamiya launched its TA03 chassis, it produced "F" and "R" variations—F for front motor, R for rear—as well as an "RS," which was a rear-motor, short-wheelbase version for the PIIA Porsche 911 kit.

The Toyota MR-S is Tamiya's latest reason to tweak a chassis, this time the dual-belt TA04 platform. To suit the "real" Toyota's short wheelbase,

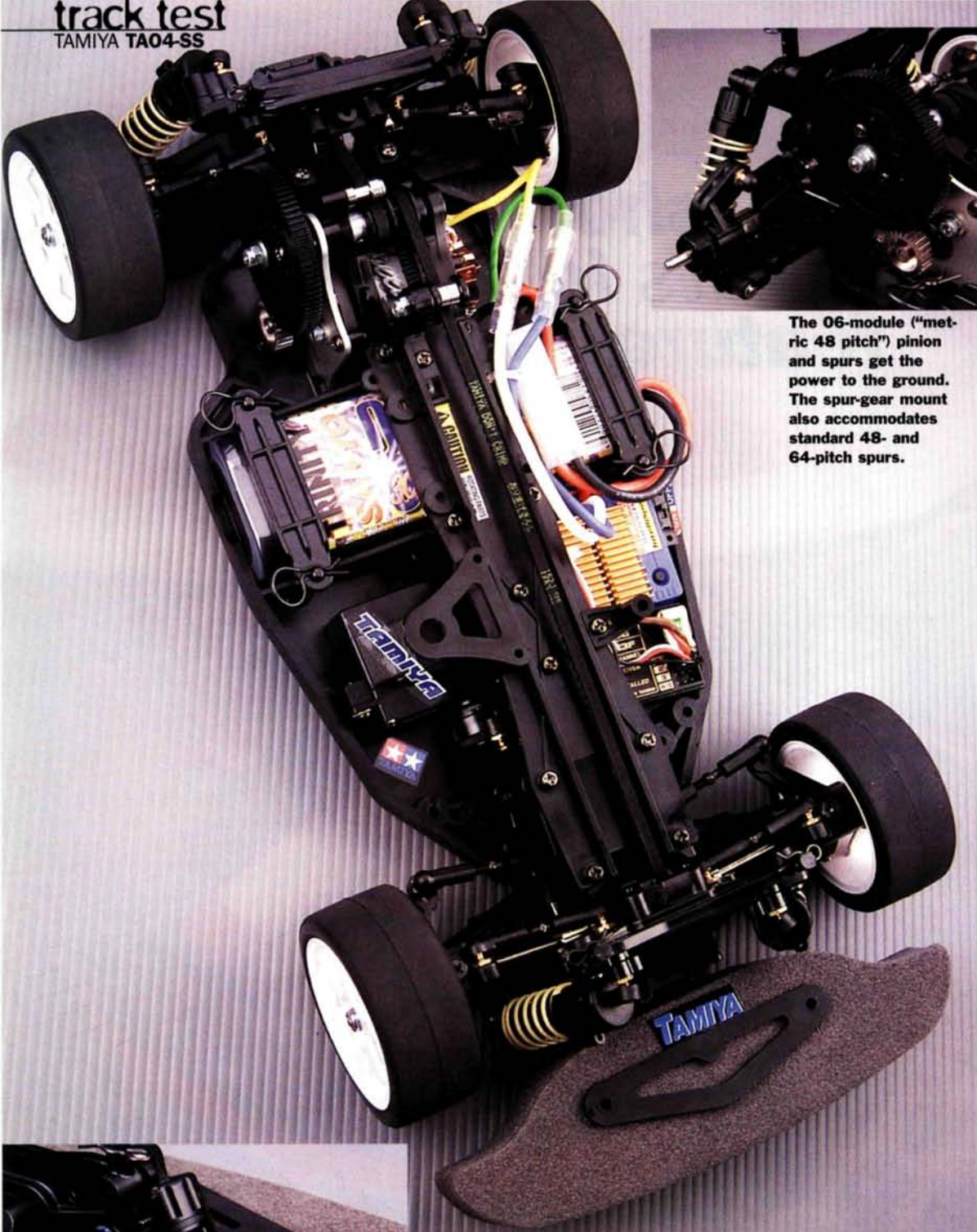


# A “short” car that’s **long** on **features and fun**



Tamiya trimmed 10mm from between the standard TA04's axles by reconfiguring the rear suspension arms. The result is the TA04-SS—that's "SS" as in Sport chassis, Short wheelbase. The SS retains the standard TA04's tub-chassis and dual-belt, gear-diff layout but adds a twist in the body department. Naturally, a crisply molded clear shell is included, but Tamiya also supplies a second shell that is printed with a deep carbon-fiber pattern, and that makes this "short" TA04 even longer on features than the standard car. Is it just pretty, or is the short-wheelbase TA04-SS as nimble as the Toyota MR-S that inspired its bodywork? I'll let you know when I take a drive.





The 06-module ("metric 48 pitch") pinion and spurs get the power to the ground. The spur-gear mount also accommodates standard 48- and 64-pitch spurs.

## DATA CENTER

**VEHICLE TYPE** 4WD sport sedan

**BEST BUYER** First-time builders, all sedan fans, TCS racers

**KIT RATINGS** (poor, satisfactory, good, very good, excellent)

**Instructions** Excellent

**Parts fit and finish** Very good

**Durability** Very good

**Overall performance** Very good

## SPECIFICATIONS

**MANUFACTURER** Tamiya

**MODEL** Toyota MR-S TA04-SS

**SCALE** 1/10

**PRICE** (varies with dealer)

\$184.99

### DIMENSIONS

**Wheelbase** 9.72 in. (247mm)

**Width** 7.44 in. (189mm)

### WEIGHT

**Total, as tested** 54.4 oz. (1,542g)

### CHASSIS

**Type** 3mm semi-tub with upper deck

**Material** Plastic

### DRIVE TRAIN

**Type** Dual belt 4WD

**Primary** 26T pinion/83T spur gear

**Transmission ratio** 2.13:1

**Final drive ratio** 7.07:1

**Drive shafts** Dogbones

**Differentials** Bevel-gear

**Bearing type** Metal-shielded ball bearings

### SUSPENSION

**Type** Lower A-arms with steel turnbuckles

**Shocks** Oil-filled, plastic-body coil-overs

### WHEELS

**Type** One-piece, white, 6-spoke

### TIRES

**Type** 26mm rubber slicks with inserts



Left: camber and toe adjustments are made easier with the inclusion of turnbuckles. Tamiya includes an adjustment wrench as well.

Right: oil-filled plastic-bodied shocks grace all four corners of the SS. Two upper and two lower shock-mounting locations allow you to tailor the car's handling to your liking.



BALL BEARINGS USED TO BE UNHEARD OF IN A "SPORT" KIT, BUT, FORTUNATELY, THAT ISN'T THE CASE ANY LONGER.



## KIT FEATURES

**CHASSIS.** The backbone of the TAO4-SS is a molded semi-tub chassis with upper deck. The lower chassis plate is fairly flexible without the upper deck installed, but when the two are bolted together, only the slightest hint of chassis flex can be detected. The upper and lower plates are cleverly keyed together without needing separate support posts. Because there aren't any support posts to shift during an impact, this design helps eliminate the possibility of the chassis becoming tweaked in a collision. This also reduces the parts count, which simplifies assembly.

The servo is mounted on the right side of the chassis, and the speedo and receiver are placed to the left. If chassis real estate later becomes a bit cramped because you switch to a larger ESC or receiver, you can mount the receiver on top of the servo.

The battery is mounted longitudinally in a molded channel in front of the motor, and it's held in place with two molded straps that are secured with body clips. Even though the TAO4-SS is marketed as a sport kit, it comes with a transponder mount that can be attached to the upper deck. That means when you are ready to race, the SS will be, too.

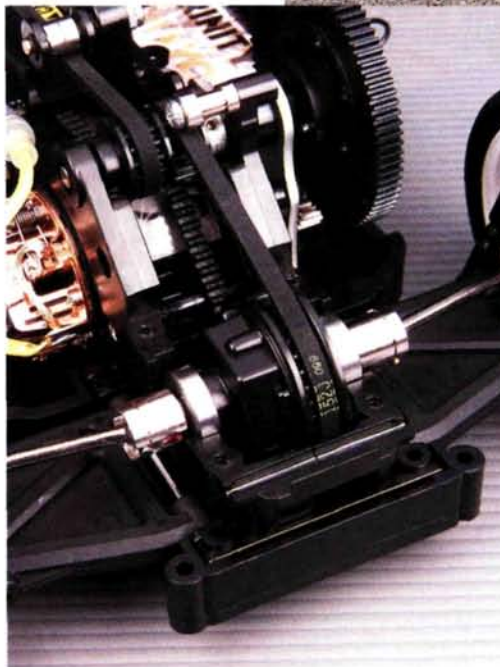
**DRIVE TRAIN.** The drive train is a typical two-belt configuration; each belt wraps around a layshaft-mounted pulley and extends around bombproof gear diffs, and dogbones send power from the diff outdrives to steel axles at all four corners. Over time, the belts may tend to loosen and skip under acceleration; Tamiya accounted for that by including adjustable ball-bearing tensioners for the front and rear belts.

The kit includes an 83-tooth, o6 module ("metric 48 pitch") spur and 25-tooth pinion. With this gear ratio and a 2.13:1 final drive, the gearing is calculated at 7.07:1, and that's a good starting point for a stock motor. The spur-gear mount does allow you to use standard 48- or 64-pitch spurs, but I stayed with the kit's metric gears for a true box-stock test.

Tamiya gets high praise for including a full set of metal-shielded ball bearings. In the not-too-distant past, if you wanted to use them, expensive bearing kits had to be purchased separately for any sedan—even a Pro level kit. Ball bearings used to be unheard of in a "sport" kit, but, fortunately, that isn't the case any longer.



In addition to a clear shell, Tamiya supplies this stunning factory-finished "carbon fiber" body. It's Lexan, but the printed pattern looks convincing.



**Left:** ball bearings support the outdrives on the gear diff. The bearing at the top acts as a belt guide to help prevent belt skipping when under power. **Above:** just about every Tamiya chassis has used this bevel-gear diff, with good reason: it is smooth, reliable and very long lasting.

**SUSPENSION AND STEERING.** The MR-S uses fairly standard touring-car suspension components. Plastic-bodied, oil-filled shocks provide damping to the molded lower A-arms. The arms

pivot on hinge pins and are swept toward the center of the car to achieve the shorter wheelbase instead of using a shorter chassis. The arm-sweep redesign allows owners to use all the hop-ups available for the standard TAO4.

The A-arms and bulkhead are built to accept Tamiya's optional swaybars. Caster is fixed at the front hubs, and toe and camber are adjustable via steel turnbuckles. The rear uprights feature two lower mounting locations for ride-height and roll-center adjustments, and you have two choices for camber-link placement. The molded front shock tower has two upper

## BUILDING & SETUP TIPS

Tamiya's instruction manuals are among the best in the industry, but here are some pointers that can help with assembly.

**PICK UP A GOOD NO. 2 SCREWDRIVER;** it will make life a lot easier during assembly.

**BE SURE TO USE GREASE ON THE DIFF OUTDRIVES AND THE AXLES** to minimize wear, but just don't overdo it; excess grease attracts dirt.

**GEARING.** Replace the included metric gears with standard 48-pitch gears. This will make gear changes easier because the pinions are more readily available.

**STEP 1.** The gear diffs are adjustable by using different grease. If the car oversteers, apply a few dabs of grease to the front diff. If you want more steering, apply the grease to the rear diff.

**STEP 16.** Use calipers to measure the length of all four shocks. If the lengths are unequal, your new car will be tweaked from the start.

When you clip the pistons off the parts tree, there may be some flashing left over that could cause the piston to drag on the body of the shock. I used 150-grit sandpaper to remove the flashing.

**STEP 23.** Jump ahead and do this step before step 15, as it's a lot easier to complete with the top deck off. Whether you mount the receiver on the left side of the chassis or on top of the receiver, you'll need to route one wire past the front belt. Cut a piece of servo tape about 3 inches long, and wrap it over the ridge that divides the chassis. Tuck the wire into place alongside the servo tape, or for extra security, use some Shoe Goo.

### YOU'LL NEED

- Transmitter and receiver
- Steering servo
- Throttle servo (or electronic speed control)
- 6-cell stick pack
- Charger
- Polycarbonate-compatible paint

### FACTORY OPTIONS

- Ball differential—item no. 53436
- On-road-tuned hard-spring set—53440
- Color stabilizer set (F/R)—53441/53442
- Universal shaft set—53438
- Aluminum motor heat sink—53437
- Aluminum hub set for spur gear—53452

Partial listing



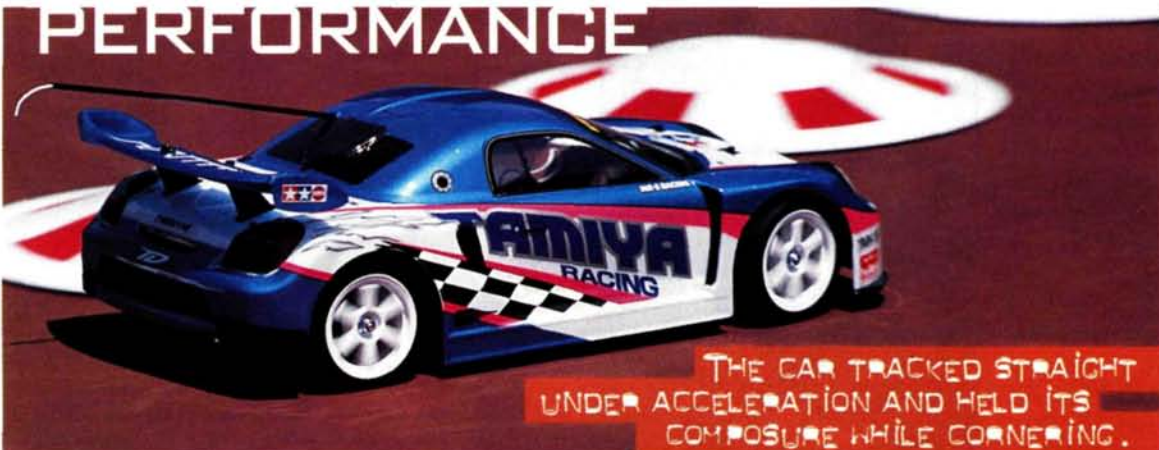
shock-mounting positions, and the rear tower offers three. Multiple camber-link positions further increase the tuning options because there are five holes on the rear bulkhead and three on the front.

Silky smooth, ball-bearing-supported bellcranks are connected to the servo and keep the SS pointed in the proper direction. An included turn-buckle wrench assists with adjustments.

**BODY, WHEELS AND TIRES.** Tamiya is deservedly known as having perhaps the highest-quality RC bodies in the world. The TA04-SS kit comes

with two sweet-looking Toyota MR-S bodies: one is clear and the other has a printed carbon-fiber finish (just like the carbon Altezza body included with the TA04-R). Decal sets are included to detail each body, along with wings and mounting hardware. Local airbrush master Russ Schacht replicated the box art on the clear body for me.

The 26mm slick tires are wrapped around sharp-looking, white, 6-spoke rims. The tires are molded of a slightly harder compound for extended wear, and they provide decent grip on a variety of surfaces. Included foam strip inserts help support the sidewalls.



I hit the track with a freshly charged 3,000mAh pack with high expectations. For the "maiden voyage," I set up a track layout that was similar to the one at Tamiya America in Aliso Viejo, CA. After setting up the speed controller and steering trims, I opened up the throttle. The stock motor left a lot to be desired for top speed, but the chassis' handling felt very comfortable with the kit setup.

After the first battery dumped, I swapped the 540 kit motor for a new Trinity Speed Gem Pro Amber 17-Double motor. I left the gearing alone and simply reaped the pack. When I punched the throttle, all four tires lit up as they struggled to get all the power to the ground, but the car was still very controllable with a bit of push. The car tracked straight under acceleration and held its composure while cornering.

The sedan that I race weekly is a TA04, so I had a good idea of what changes the car needed to better dial it in. To get more steering from the car, I exchanged the kit tires for Tamiya B2s but kept the kit-included inserts. The car's performance was much better, but it still had some understeer, so I moved the rear shocks out one hole on the rear shock tower, and the car's steering was much improved. I didn't have any with me, but I would have liked to try a

swaybar on both ends of the car; the SS exhibited some chassis roll that swaybars could have eliminated. Another fix for the roll would have been to rework the shocks with different oils and springs, but I was just having too much fun power-sliding the car through the turns. I do plan on trying the new arms from the SS and the MR-S body on my 04 to see how the shorter wheelbase handles on a full-option chassis.

## THE VERDICT

I have loved the TA04 platform since I first drove it almost two years ago, and the SS provides similar driving pleasure. With a DuraTrax reversible ESC, this car did some of the easiest "Rockfords" of any car I've ever driven, and that never gets old.

From the stunning body detail to the capable handling of the chassis, the TA04-SS has a lot of racing potential. Aimed at an entry-level market, the SS can be hopped up to full TRF status when you're ready. I could have worked on the chassis more to dial it in, but I would rather drive than wrench. There aren't many cars that are as much fun to build as they are to drive, but the SS is simply an absolute blast on the bench and on the track.

## Trinity Speed Gems Pro Amber

I replaced the kit Mabuchi motor with a Trinity Speed Gems Amber 17-turn double-wind motor. It features the new P-94 end-bell, ball bearings, machine-wound armature and adjustable timing.



Additional items used to complete the TA-04SS

**Futaba 3PDF transmitter**

**DuraTrax Intellispeed 16T reversing speed control**

**Trinity Sanyo 3000HV sport pack**

**Cirrus CS-65 steering servo**

## SOURCE GUIDE

**CIRRUS:** distributed by Global Hobby Distributors (714) 964-0827; globalhobby.com.

**DURATRAX:** distributed by Great Planes Model Distributors; duratrax.com.

**FUTABA:** distributed exclusively by Hobbico/Great Planes Model Distributors Co.; futaba-rc.com.

**GREAT PLANES MODEL DISTRIBUTORS** (800) 637-7660; greatplanes.com.

**TAMIYA AMERICA INC.** (800) 826-4922; tamiyausa.com.

**TRINITY PRODUCTS INC.** (732) 635-1600; teamtrinity.com.

## DISLIKES

- There is some slop between the hub carriers and the bearings.
- This is the first Tamiya body in a long time that doesn't have predrilled body-mount holes.

## THE COMPETITION

MODEL	CHASSIS	DRIVE TRAIN	BALL BEARINGS	DIFFERENTIALS	AXLES	ALSO SOLD RTR	STREET PRICE (KIT)	REVIEWED
Associated TC3 Racer	Molded semi-tub	Shaft	Complete set	Ball	Universal	Yes	\$174	9/01 RTR tested*
HPI RS4 Sport 2	Fiberglass	Dual-belt	Complete set	Bevel-gear	Dogbones	No	\$160	11/00
MRC Academy STR-4	Molded semi-tub	Shaft	Bushings	Bevel-gear	Dogbones	Yes	\$129	4/00
<b>Tamiya TA04-SS</b>	<b>Molded semi-tub</b>	<b>Dual-belt</b>	<b>Complete set</b>	<b>Bevel-gear</b>	<b>Dogbones</b>	<b>No</b>	<b>\$184</b>	<b>11/02</b>
Traxxas 4-TEC	Molded composite	Dual-belt	Drive train only	Ball	Universals	Yes	\$134	9/01 RTR tested*

Partial listing; category is too large to include all vehicles. Price varies with dealer. \*RTR 4WD Electric Touring Car Shootout.







# Thunder Tiger FM-1e

## "HEY, DO THEY MAKE REMOTE-CONTROL

**MOTORCYCLES?"** You're bound to hear that question once you chat with the inevitable bunch of guys who stop by the parking lot to check out the car you're running. The short answer is "yes," but for too long, bikes haven't really been a viable part of the RC scene. Nuova Faor briefly buoyed hopes of a two-wheeler revival with the SF501 (reviewed in the October 2001 issue), but the bike was offered only through National Hobby and was soon discontinued.

This is where Thunder Tiger comes in with its new FM-1e electric motorcycle. The aluminum bike is patterned closely on the aforementioned Nuova Faor design, but unlike SF501, the FM-1e is clad in Yamaha R1-style bodywork with a realistic-looking vinyl rider at the controls, and it has been fully assembled and painted for you by Thunder Tiger. To complete the bike, you'll have to add a motor, battery, ESC and radio, but no special equipment is required; off-the-shelf, regular-size gear drops right in thanks to the bike's large 1/5-scale proportions. If any kit can take motorcycles into the mainstream, the FM-1e looks like the one.





A full-page photograph of a motorcycle racer in a red and blue suit leaning into a turn on a red track. The racer is wearing a helmet and a suit with 'Thunder' and 'INTERNATIONAL' written on it. The motorcycle is blue and black, with 'MICHELIN' visible on the side. The background is a blurred green field.

# Bikes are back!

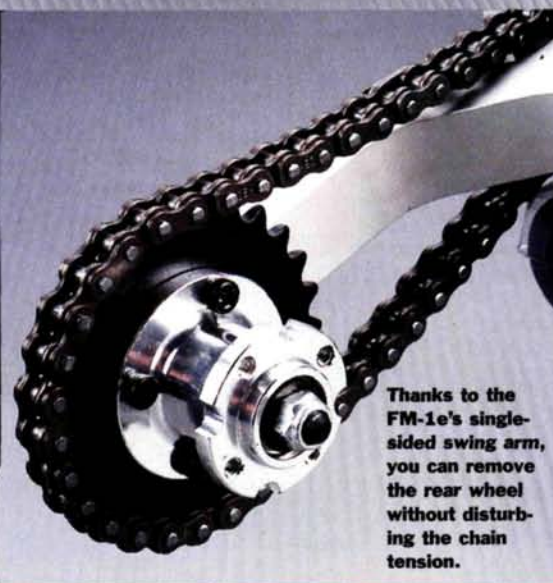




The pinion and spur gear are accessed on the right side of the chassis. There's room to gear up, but you'll have to remove the motor if you want to replace the pinion. Note the machined-aluminum bearing carrier and the 5mm shaft the bearing supports; it does double duty as a jackshaft for the drive sprocket and the rear swing-arm pivot.



The swing arm is a single piece of machined aluminum and is slotted to permit chain-tension adjustment.



Thanks to the FM-1e's single-sided swing arm, you can remove the rear wheel without disturbing the chain tension.



## DATA CENTER

**VEHICLE TYPE** Electric 1/5-scale motorcycle

**BEST BUYER** Any motorcycle fan

**KIT RATINGS** (poor, satisfactory, good, very good, excellent)

**Instructions** Satisfactory

**Parts fit and finish** Very good

**Durability** Very good

**Overall performance** Very good

## SPECIFICATIONS

**MANUFACTURER** Thunder Tiger

**MODEL** FM-1e

**DISTRIBUTED BY** Ace Hobbies

**SCALE** 1/5

**PRICE** (varies with dealer) \$250

### DIMENSIONS

**Overall length** 17.3 in. (439.4mm)

**Wheelbase** 11.6 in. (294.6mm)

**Width** 7 in. (177.8mm)

### WEIGHT

**Total, as tested** 73 oz. (2,074.5g)

### CHASSIS

**Type** Ladder frame

**Material** 2mm aluminum plate with plastic standoffs

### DRIVE TRAIN

**Type** Single-speed chain drive

**Primary** 14 pinion/70 spur gear

**Sprocket ratio** 2.6:1

**Final drive ratio** 13:1

**Bearing type** Metal-shielded ball bearings

### SUSPENSION

**Type** F/R Telescoping fork/single-sided swing arm

**Shocks** F/R Friction-damped coil springs/aluminum-body, fluid-damped with clip-on preload spacers

### WHEELS

**Type** One-piece machined aluminum, 3-spoke

### TIRES

**Type** F/R Rubber slick with foam insert/rubber slick

THE FM-1e's CONSTRUCTION IS VERY CAR-LIKE AND IS BUILT ALMOST ENTIRELY OUT OF 2MM ALUMINUM PLATE.

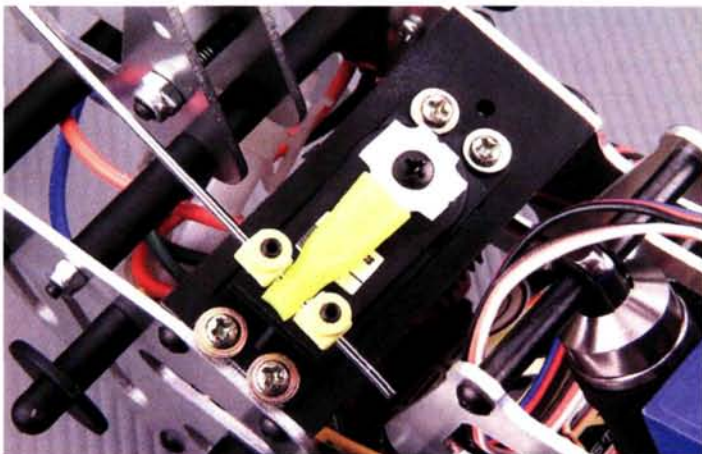


## KIT FEATURES

**CHASSIS.** The FM-1e's construction is very car-like and is built almost entirely out of 2mm aluminum plate. Plastic standoffs turn the flat plates into a boxy structure with three primary sections: front suspension bulkhead, rear subframe and main chassis. A Lexan tray beneath the main chassis holds a full-size, 6-cell stick pack, and a thick machined-aluminum mount centers your choice of 540-size motor in the frame for proper balance. A shelf built into the rear subframe holds the receiver, and a plastic bridge that joins the left and right main chassis plates also serves as the steering servo mount.

**DRIVE TRAIN.** Cruisers get shaft drive, Harleys use belts, but high-performance motorcycles still rely on chains to spin the rubber at the business end of the bike. The FM-1e is no different; it uses a steel, 6.5mm-pitch roller chain (complete with master link) and steel sprockets to spool up the rear wheel. The front sprocket and spur gear share a layshaft, which makes the FM-1e essentially a direct-drive machine. The 10-tooth front sprocket and 26-tooth rear sprocket deliver a 2.6:1 transmission ratio; couple this with the included 70-tooth spur gear and 14-tooth pinion, and the FM-1e's final drive ratio is 13:1. That may sound undergeared, but remember: the bike's rear wheel is 93mm in diameter; that's a lot of rollout. Metal-shielded ball bearings are used throughout, and a clear Lexan chain guard protects careless fingers from getting pinched by the chain.

**SUSPENSION AND STEERING.** A simple but clever telescoping front fork is the FM-1e's first line of defense against bumps, and since any loss of contact between the front tire and pavement is likely to cause a crash, the fork is very lightly friction-damped for maximum responsiveness. Hollow aluminum lower legs slide on 8mm steel stanchion tubes, and a spring in each leg does the shock-absorbing. Nylon bushings on the ends of the stanchion tubes keep the lower legs concentric with the stanchions, and aluminum collars with O-ring seals cap the lowers and prevent them from sliding off the stanchion tubes by using the nylon bushings as top-out bumpers. A pair of plastic triple clamps holds the fork legs to a thick, machined-aluminum spar that is joined to the chassis with a pair of alu-



**Above:** it's weird, but it works. The fuel-tubing-linkage mounts give the front fork the wiggle room it needs to react to bumps. **Left:** the front fork is a simple spring-loaded design with plated-steel stanchions and aluminum sliders. The sliders' threaded caps contain a single O-ring seal to prevent grit from scoring the stanchions.



minum plates. The spar is spring-loaded to allow the forks to flex backward in a crash, and a screw adjusts the spar angle as a means of altering the fork's rake.

To steer the bike, a servo mounted on the chassis pushes and pulls the fork's triple clamps via a linkage rod and ball joint. But instead of the linkage being attached directly to the servo horn, it is attached to a piece of silicone tubing forced over the end of the horn. The flexible tubing lets the linkage deflect bumps or other irregularities that the front wheel encounters.

The FM-1e's monoshock-supported, single-sided rear swing arm is one of the bike's technical highlights. The arm is hewn from a single chunk of aluminum billet and wards off flex with a massive 16mm cross-section. The layshaft that holds the spur gear and front sprocket doubles as the hinge pin for the swing arm—an important performance detail as well as a clever bit of space-saving packaging. By having the swing arm pivot on the same axis that the drive sprocket turns on, the torque exerted by the drive train does not extend or compress the rear suspension.

## BUILDING & SETUP TIPS

The FM-1e arrives fully assembled and painted, leaving only the installation of an ESC, motor, steering servo and receiver to you. The included manual and foldout parts schematic are helpful but contain no setup or operating tips. Here are a few tips to help the electronics installation and final running preparations go smoothly.

**PINION POSITION.** The instructions call for the included pinion to be installed with its mounting boss facing the motor, but it should be installed in the opposite position—teeth toward the motor, mounting boss facing out. Tighten the pinion onto the motor before you install it, as there is no access to the pinion's setscrew once the motor has been installed.

**MOTOR INSTALLATION.** Do yourself a big favor, and remove the bike's front suspension before you install the motor and ESC (just remove the shafts that hold the front suspension mount, and the entire front end assembly lifts out). You'll still have to exercise some ship-in-a-bottle technique to install the motor and ESC, but it's much easier to do with the front end off.

**ESC INSTALLATION.** The instructions call for the ESC to be taped to the right chassis plate, but I taped it to the top of the battery tray instead, so its weight would be on the bike's centerline.

**SERVO INSTALLATION.** The manual's illustration of this is incorrect; install the servo so its output shaft is centered between the chassis plates, not offset as shown. The instructions don't make this very clear, but you're to force the supplied silicone tubing over the steering servo horn to act as a flexible linkage arm. I didn't trust the grip of the silicone tubing alone to hold it in place, so I cut a "step" into the servo horn and cinched the silicone tubing tightly over it with a zip-tie.

**FORK TUNE-UP.** The FM-1e's front suspension binds easily. To smooth its action, I disassembled the forks, polished the stanchion tubes and lubed the slider caps' O-ring seals with Associated Factory Team Green Slime.

**GLUE THE TIRES.** The instructions don't note the need for glue, but the tires don't fit the rims tightly enough to go without it. I used Team Losi Bead Lock glue to do the job, after I had thoroughly wiped down the wheels with alcohol to remove any residue from the machining and finishing processes.

**SET THE SAG.** As assembled by Thunder Tiger, the rear suspension has a lot of sag and uses up almost all of its travel just by settling under its own weight. Use the supplied preload spacers to raise the ride height so the suspension sags only about 5mm.

### YOU'LL NEED

- Motor
- Electronic speed control
- Steering servo
- 6-cell stick pack
- Charger
- Transmitter and receiver



A heavy-duty shock that appears to be from Thunder Tiger's 1/8-scale buggy-parts inventory suspends the system and is factory-filled with thick fluid for firm damping. A stiff spring is fitted, but the rear suspension feels "soft" because of the extra leverage of the long swing arm and the shock's well-inboard mounting position. Clip-on spring preload spacers set the amount of rear sag, and the shock is squeezed directly between the swing arm and the frame; unlike a full-size bike, there is no variable-rate linkage system (nor is one required for RC action).

**BODY, WHEELS AND TIRES.** The FM-1e has Lexan bodywork just like a car; unlike a car, the body is a multi-part affair. The fuel tank, seat and tail section are molded together, and the front fairing is one piece. The front fender is taped to the lower fork legs, and the rear is bolted to the swing arm. The parts are sprayed blue and decaled with R1-style graphics, but the bike

isn't officially licensed, so there aren't any Yamaha logos.

The FM-1e's wheels are important to its performance, as it is their gyroscopic effect that prevents the bike from falling over once it's rolling. To increase that gyro effect, the wheels are machined from aluminum rather than being molded of lighter plastic—heavier wheels equal more gyro action. An added plus is that the lathe-turned wheels are very true—no runout or hop to be found.

A realistic, round-carbass slick tire is fitted to the rear wheel minus glue and is supported only by its thick-rubber construction. The front tire is made of the same stuff but has a much thicker, firmer tread to help it better handle steering forces. The front tire's shape is also important to the bike's steering; its distinctly pointed cross-section causes the bike to "fall onto" the tire's flat sidewalls when a turn is initiated, and that helps lean the bike over to complete the turn.

**Team Orion Rocket Pack  
2400 battery**

It's rapidly becoming a NiMH world, but there's still good reason to run Ni-Cds like the Sanyo 2400mAh cells in Orion's Rocket Pack. The 2400s don't require a special charger, and they don't mind being deeply discharged and stored depleted. Orion does a nice job assembling the packs as well, with a tight shrink job, high-quality silicone wire and the gotta-have-it Tamiya connector.



**Team Orion  
Core RS  
stock motor**

With its weighty, large-diameter wheels, I figured a torquey stock motor would be the best power choice for the FM-1e. The



Core RS, Orion's best stocker, has a lot of features, including a drilled-out "Power Tunnel" armature, installed surface-mount capacitors and the latest G12 magnets. I installed the "regular" Core, but Orion offers a "Speed Treated" version with a diamond-cut commutator, special brushes, zapped magnets, treated bushings and a dyno printout.

**Additional items used to complete the Thunder Tiger FM-1e**

**Airtronics Blue Blazer transmitter and receiver**

**Airtronics 94102 steering servo**

**Novak Fusion ESC**

# PERFORMANCE

I chose a wide-open parking lot to test the FM-1e, as I knew the bike's direction would not be as precisely controllable as a car's would be. I gave the bike a gentle push as I rolled on the throttle, and it was under way. Even at low speed, the FM-1e was surprisingly well balanced, and it only gets more stable as speed is built up and the wheel's gyro effect stabilizes the machine.

The FM-1e is actually quite easy

to drive, and it looks incredibly realistic as it hunkers down in the turns. Tightening and widening the bike's cornering line is easy, but transitioning from left to right takes practice and foresight: it's important to think ahead as you drive. Unlike a car, the FM-1e does not respond instantly to commands—at least, not cornering commands. When it's time to stop, the FM-1e plants its rear tire and scrubs speed quickly. But be careful; if you lock up the rear wheel, the bike will fall over. To make braking a no-brainer, I used my Blazer transmitter's throttle endpoint adjustment to set the maximum brake throw just short of lockup.

- LIKES**
- Factory-painted Yamaha R1 bodywork and realistic vinyl rider figure.
  - No special electronic gear required.
  - Nearly all-aluminum construction.

**EVEN AT LOW SPEED, THE FM-1E WAS SURPRISINGLY WELL BALANCED, AND IT ONLY GETS MORE STABLE AS SPEED IS BUILT UP**

With practice, the FM-1e can be steered around a road course, but it's best suited to oval running—not surprising, as Thunder Tiger's design for the FM-1e was originally created for oval racing. Apparently, there actually is a class for this in Europe. Bring it to the States!

## THE VERDICT

Thunder Tiger has the best RC motorcycle yet. The realistic bodywork and lifelike rider figure make the FM-1e a treat to watch in action, and the bike is full of technical details that make it a "serious" piece of RC equipment rather than a mere novelty. Compatibility with standard-size radio gear is another bonus and helps keep down the cost of adding a motorcycle to your RC stable. So the next time you hear, "Hey, do they make remote-control motorcycles?," respond by pulling one out of your gear bag and tearing up the parking lot—two-wheel style.

## DISLIKES

- Instructions offer no operating tips.
- Front suspension needs a little tweaking to operate smoothly.

## SOURCE GUIDE

**AIRTRONICS** (714) 978-1895; airtronics.net.

**NOVAK ELECTRONICS INC.** (949) 833-8873; teamnovak.com.

**TEAM ASSOCIATED** (714) 850-9342; teamassociated.com.

**TEAM ORION INC.** (714) 694-2812; team-orion.com.

**THUNDER TIGER**; distributed by Ace Hobby (949) 833-0088; thundertiger.com; acehobby.com.







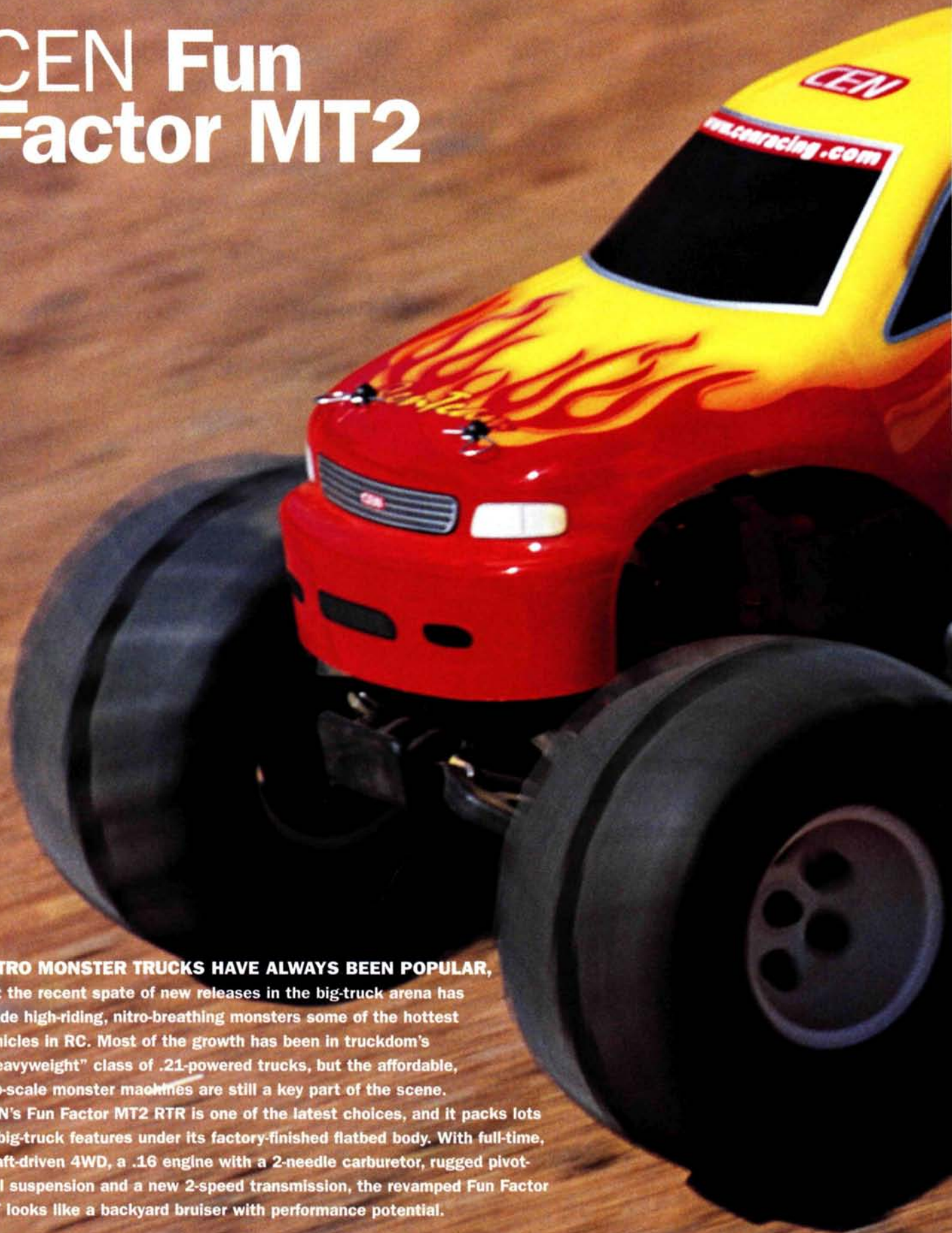


# CEN Fun Factor MT2

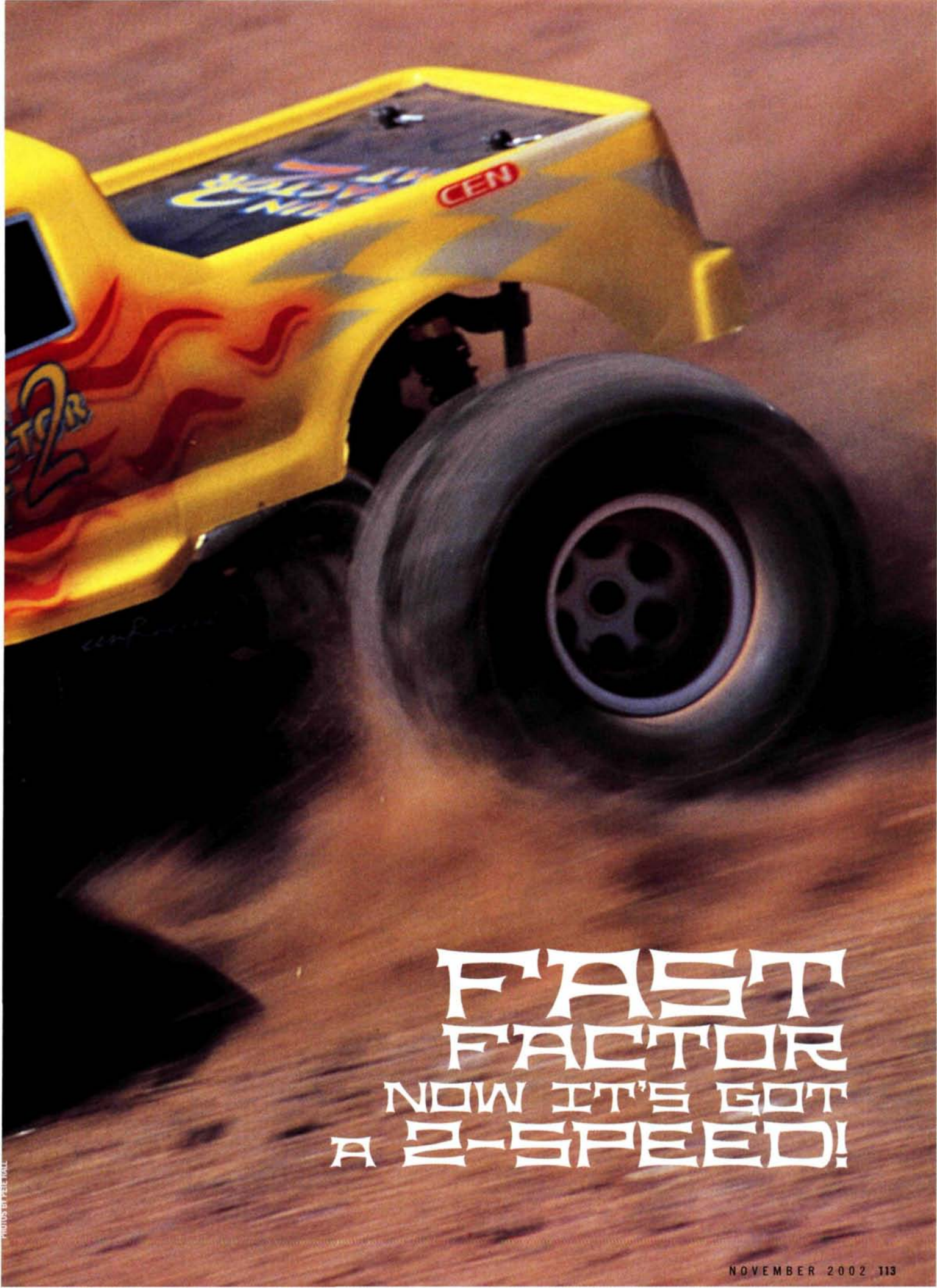
## NITRO MONSTER TRUCKS HAVE ALWAYS BEEN POPULAR,

but the recent spate of new releases in the big-truck arena has made high-riding, nitro-breathing monsters some of the hottest vehicles in RC. Most of the growth has been in truckdom's "heavyweight" class of .21-powered trucks, but the affordable, 1/10-scale monster machines are still a key part of the scene.

CEN's Fun Factor MT2 RTR is one of the latest choices, and it packs lots of big-truck features under its factory-finished flatbed body. With full-time, shaft-driven 4WD, a .16 engine with a 2-needle carburetor, rugged pivot-ball suspension and a new 2-speed transmission, the revamped Fun Factor MT looks like a backyard bruiser with performance potential.





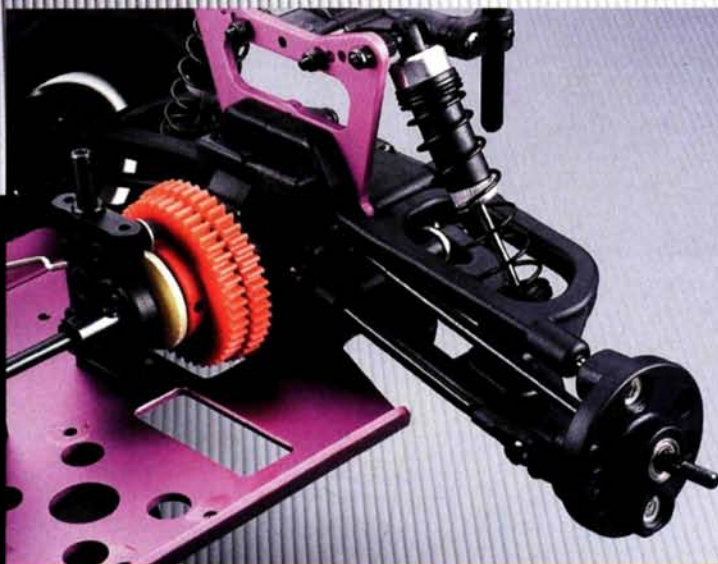


**FAST  
FACTOR  
NOW IT'S GOT  
A 2-SPEED!**





This shot gives you a good view of the MT2's fiberglass brake rotor, 2-speed tranny and deeply radiused chassis. The suspension is very rugged; notice the substantial, hinge-pin-supported upper arm with pass-through shock, the adjustable toe-in link and the disc-shaped hub carrier. You can also spot one of the truck's 18 shielded ball bearings on the stub axle; dogbones are used in the rear, but universal-joint axles are found up front.



## DATA CENTER

**MANUFACTURER** CEN

**MODEL** Fun Factor MT2

**VEHICLE TYPE** 1/10-scale, RTR, 4WD, nitro-powered monster truck

**BEST BUYER** Any nitro-power newcomer or monster-truck fans on a budget.

**KIT RATINGS** (poor, satisfactory, good, very good, excellent)

**Instructions** Very good

**Parts fit/finish** Very good

**Durability** Very good

**Overall performance** Good

## SPECIFICATIONS

**SCALE** 1/10

**STREET PRICES** \$300

### DIMENSIONS

**Wheelbase** 10.75 in. (274mm)

**Width** 13.5 in. (340mm)

### WEIGHT

**Total, as tested**

67.4 oz. (1.911g)

### CHASSIS

**Type** 2mm stamped plate

**Material** Purple-anodized aluminum

### DRIVE TRAIN

**Type** 4WD shaft, enclosed gearbox

**Drive shafts (F/R)** Universal joint/dogbone

**Differentials** Bevel gear

**Bearing type** Ball bearings

### SUSPENSION

**Type** Upper and lower A-arm, pivot ball

**Shocks** Plastic-body, fluid-damped, coil-over

### WHEELS

**Type** One-piece plastic 2.2-in.

### TIRES

**Type** Chevron-tread, monster-truck type

THE MT2'S DEEPLY RADIUSD CHASSIS AND AMPLE BRAKING MAKE IT A RUGGED PLATFORM FOR OFF-ROAD ACTION.



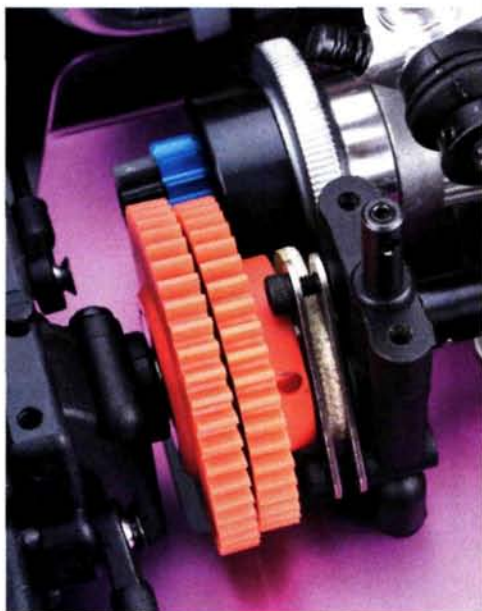
## KIT FEATURES

**CHASSIS.** The MT2's chassis is dominated by its casket-shaped radio box, which fills the left side of the truck's 2mm-thick, purple-anodized main chassis plate and holds the included receiver and 4-cell battery case with room to spare. The throttle servo is placed alongside the box, and the steering servo is installed upside-down in the front upper deck. A short brace ties the rear gearbox and spur-gear bulkhead to the chassis, and a separate nose plate is attached to the main chassis via screws that thread into steel inserts.

**DRIVE TRAIN.** Full-time 4WD separates the MT2 from most other 1/10-scale nitro trucks, and CEN wisely chose a shaft-drive system to spin all four wheels. A disc-brake system with steel pads and a fiberglass rotor is unchanged from the original MT, but a new

2-speed transmission places two spur gears where the original MT had just one. The shifting mechanism is a basic single-pin, drive-dog setup that appears robust. The 2-speed is attached directly to the rear gearbox's input shaft that is supported within the gearbox by shielded ball bearings. A cast-metal, bevel pinion within the gearbox spins the diff via a ring gear that's also made of cast metal. The differential is a 4-gear unit with a plastic housing and is identical to the front differential. A single steel dogbone extends from the rear-mounted 2-speed tranny up to the front gearbox. Universal-joint front axles are standard equipment, and dogbones are used in the rear. Plastic, 12mm drive hexes secured with crosspins are the final touches, and metal-shielded ball bearings support all the drive parts.

**SUSPENSION AND STEERING.** The MT2 is very "T-Maxxy" in the suspension department, thanks to front and rear pivot-ball-supported hub



**Above:** the MT2's NT-16 engine ran strongly throughout testing and was easy to tune thanks to its 2-needle carburetor. The trombone-like manifold is a requirement of the NT-16's rear-facing installation on the chassis.

**Left:** there's just enough room for the MT2's fiberglass disc brake between the 2-speed and the bearing block. Note that the 2-speed is attached directly to the rear gearbox; a long driveshaft extends to the front of the chassis to power the front gearbox.

carriers and pass-through upper arms that wrap around each shock as it reaches down to the lower suspension arms. The front and rear hub carriers are identical; each uses bolt-on extensions to configure them as "front" and "rear" parts. Bellcrank arms are attached to the front carriers where they are actuated by threaded rods that are connected to the truck's dual-bellcrank steering. The rear carriers get short bosses that are also attached to threaded rods, but these rods are fixed to the chassis to prevent the hub carriers from flopping around.

Eight plastic-body shocks capably suspend the MT2, and they are factory-filled with fluid as part of CEN's RTR package. Aluminum top and bottom caps add a little bit of brightwork to the shocks and also make for easy rebuilds.

**ENGINE AND ACCESSORIES.** CEN's house-brand, pull-start NT-16 engine appears to be just another basic engine, but it has a lot of nice features. The sleeve is chrome-plated brass, and the piston is aluminum, which gives it true "ABC" construction. A 2-needle carburetor is standard (something you rarely see in an RTR), and a machined heat-sink head is

## ELECTRONICS & ACCESSORIES

### CEN Mirage III transmitter and receiver

CEN has given the Mirage a mild makeover by molding its case in gray plastic instead of black and highlighting the steering wheel with silver accents, but otherwise, it's the same toy-like lump it has always been, but the transmitter and receiver work perfectly well and even include dual-rate steering.

### CEN 82103 steering and throttle servos

These standard-type servos feel as if they're good for about 30 oz.-in. of torque, and they performed reliably in testing. They're noisy, though; you can really hear the gears working, and their transit times feel slow. But they never failed, and in an RTR truck that's designed for play, durability is what counts most.



### CEN Nitro handbook

All of CEN's nitro-powered vehicles now come with a comprehensive engine tuning and maintenance guidebook to help the first-time nitro driver (and even the experienced guy) get the most from his NT-16 engine, whether it's in a car, truck, buggy or boat. In addition to break-in, tuning and setup advice, it offers troubleshooting information and has plenty of illustrations that show you everything you'll need to know about nitro.

### YOU'LL NEED

- Fuel
- 12 AA batteries
- Glow starter

### FACTORY OPTIONS

- Universal-joint axles (pair)—part no. FFS003
- E-clip-type hinge pins—FFS007 (4x40mm); FFS008 (4x47mm)
- Aluminum spur-gear mount—FFS022
- Aluminum brake hub—FFS009
- Aluminum bellcrank tie bar—FFS019
- Aluminum tuned pipe—G70318

List does not include all available option parts.



standard, too. The engine is vented through a 180-degree header and a plastic, dual-chamber tuned pipe, and a single-element foam air filter prevents the engine from breathing in dust or dirt.

**BODY, WHEELS AND TIRES.** When the Fun Factor MT was reviewed in the September 2001 issue, its one-color paint job, goofy rhino-theme decals and rough trim job were low points. Thankfully, CEN has improved on all three fronts with the MT2; it sports the same shell but has a much-

improved presentation with its flame-pattern paint, attractive logo decals and much neater trim lines. The body is mounted on telescoping posts that allow you to slam the body or raise it monster-style.

The MT2's wheels and rubber are unchanged from the previous truck's; classic chevron-tread tires with foam inserts are factory-glued to white, plastic wheels with a 6-hole pattern that not only looks sharp but also allows access to the suspension pivots for wheels-on camber adjustments.

## PERFORMANCE

I've had good experience with CEN's NT-16 powerplant in a variety of vehicles; I even ran a water-cooled version in CEN's Wave Shark boat for *Radio Control Boat Modeler*! As with those other NT-16s, the Fun Factor MT2's mill fired up easily and chugged reliably through break-in. When it was time to lean out the engine for maximum power, I was very appreciative of the 2-needle carb. After running a lot of single-needle carbs and becoming used to compromise settings, I had forgotten just how crisply a nitro engine can run through its rev range. In the course of tuning the engine, I couldn't help but notice how quickly the MT2 churned up the pavement. The single-speed MT had been good for 36mph, but the 2-speed-equipped MT2 appeared to be a little faster. The radar gun



**CARTWHEELING TUMBLES DIDN'T BOTHER THE TRUCK, AND THE ONLY TIME THE ENGINE STALLED WAS WHEN IT RAN OUT OF FUEL.**

### LIKES

- Fully adjustable pivot-ball suspension.
- NT-16 engine includes 2-needle carburetor.
- Much-improved body graphics and factory trimming.

revealed that the truck did have a couple more mph on tap than its predecessor (radar-confirmed top speed was 38.2mph), but this illusion of even greater speed came from the 2-speed transmission that helped the MT2 reach its top speed more quickly and in a shorter distance than the single-speed truck's.

I moved the MT2 over to the dirt and grass of the local ball field for a backyard-style test session. The truck's chevron tires floated easily over the grass, and the soft suspension soaked up the transition from grass to dirt with barely any movement of the chassis. High jumps landed off a skateboard ramp and the pitcher's mound bottomed out the suspension, but the foam-filled tires absorbed whatever the suspension left behind, and the MT2 kept on rolling. Cartwheeling tumbles didn't bother the truck, and the only time the engine stalled was when it ran out of fuel.

The only place the MT2 left me wanting more was in the handling department. With full-time 4WD and massive monster tires, the MT2's budget-spec steering servo just couldn't steer the truck with authority. At speed, you'll have to settle for wide turns, and even at its slowest pace, the MT2 doesn't make tight U-turns well. But off-road, you can use the truck's effective disc brake to slide sideways into turns, which is always fun.

### THE VERDICT

CEN's Fun Factor MT2 has a lot going for it: a powerful, willing engine with a 2-needle carb and tuned pipe, full-time 4WD with a complete set of ball bearings, a 2-speed transmission and generally rugged construction. The only letdown is in the radio department; the transmitter just isn't as well put together as the truck, and the steering servo needs more oomph. But for the beginning nitro modeler, those deficiencies will likely go unnoticed; it's the MT2's purple parts, high speed and high-riding good looks that will get—and deserve—the attention. Radio and servo upgrades can come later; for the first timer, the Fun Factor's fun factor should be high.

### DISLIKES

- Steering servo isn't powerful enough for sharp steering response.
- Transmitter works fine but looks and feels cheap.

### Trinity Monster Horsepower

**20-percent nitro fuel**  
According to Trinity, each bottle of purple power is a blend of 99.9 percent pure methanol and nitromethane and includes a mix of synthetic and castor oils for a total lube content of 12 percent. Trinity also adds anti-foaming agents and rust inhibitors; that's good insurance for those of us who get a little lazy with post-run cleanup. But performance is what really counts, and the MT2 ran long and strong on the Trinity juice.



### SOURCE GUIDE

CEN/GENKA TRADING CORP. (714) 792-1923; cenracing.com.

TRINITY PRODUCTS INC. (732) 635-1600; teamtrinity.com.

### THE COMPETITION

	TYPE	CHASSIS	BEARINGS	ENGINE	PIPE	RTR	RADIO	STREET PRICE	REVIEWED
CEN Fun Factor MT2	4WD monster truck	2mm aluminum	Ball	CEN NT-16	Plastic, tuned	Yes	CEN Mirage III	\$300	11/02
HPI Nitro MT	Stadium truck	2mm aluminum	Ball	HPI Nitro Star 15FE	Plastic, tuned	Yes	HPI TX2	360	7/00
Traxxas Stampede	2WD monster truck	2mm aluminum	Ball	TRX .15	Plastic, tuned	Yes	Traxxas TQ	300	10/99
OFNA Pirate 10 T	Stadium truck	2mm aluminum	Ball	Force 12	Metal, tuned	Yes	Airtronics Rival	370	5/00

All models include pull-start engines. Prices shown for non-RTR models are for kit only. All prices are approximate and vary with dealer.

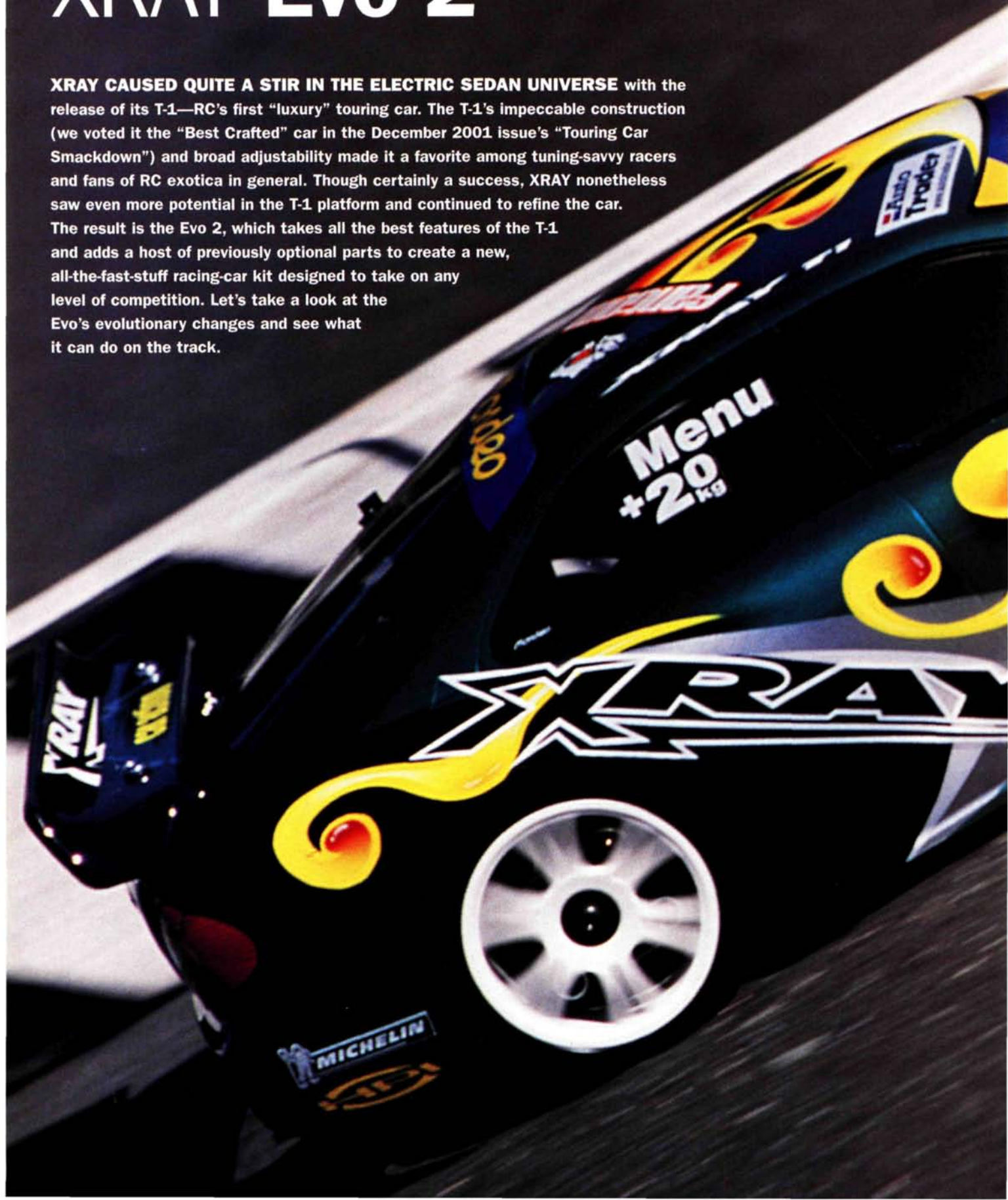






# XRAY Evo 2

**XRAY CAUSED QUITE A STIR IN THE ELECTRIC SEDAN UNIVERSE** with the release of its T-1—RC's first "luxury" touring car. The T-1's impeccable construction (we voted it the "Best Crafted" car in the December 2001 issue's "Touring Car Smackdown") and broad adjustability made it a favorite among tuning-savvy racers and fans of RC exotica in general. Though certainly a success, XRAY nonetheless saw even more potential in the T-1 platform and continued to refine the car. The result is the Evo 2, which takes all the best features of the T-1 and adds a host of previously optional parts to create a new, all-the-fast-stuff racing-car kit designed to take on any level of competition. Let's take a look at the Evo's evolutionary changes and see what it can do on the track.







***the T-1  
evolves  
FOR THE BETTER***





THE EVO 2 CAN ACCEPT A 6-CELL, SIDE-BY-SIDE BATTERY PACK ON EITHER SIDE OF THE CHASSIS.



The Evo 2's medium-length, threaded-body rear shocks are equal in size to the front shocks (unlike the T1's long rear shocks). XRAY gives you the option of building them either with fixed pistons or externally adjustable damping.

## DATA CENTER

**VEHICLE TYPE** 1/10-scale electric touring car

**BEST BUYER** Intermediate to advance racers who want top-level performance with topnotch parts quality

**KIT RATINGS** (poor, satisfactory, good, very good, excellent)

**Instructions** Excellent

**Parts fit and finish** Excellent

**Durability** Very good

**Overall performance** Very good

## SPECIFICATIONS

**MANUFACTURER** XRAY

**MODEL** T-1 Evo 2

**SCALE** 1/10

**PRICE** \$350

### DIMENSIONS

**Wheelbase** (adjustable) 9.92 to 10.28 in. (252 to 261mm)

**Width** (adjustable; F/R) 7.24 to 7.48 in. (184 to 190mm)

### WEIGHT

**Total, as tested** 51.18 oz. (1,451g)

### CHASSIS

**Type** Slotted plate

**Material** 2mm woven graphite

### DRIVE TRAIN

**Type** Dual belt with center one-way  
**Primary** 24T pinion gear/93T spur gear

**Transmission ratio** 2.125:1

**Final drive ratio** 8.23:1

**Drive shafts** (F/R) Spring-steel universals

**Differentials** "Labyrinth" ball diff  
**Bearing type** Rubber-sealed ball bearings

### SUSPENSION

**Type** (F/R) Upper and lower A-arm/lower H-arm with adjustable upper camber link

**Shocks** Threaded plastic-body with internally adjustable damping or fixed damping (assembly option)

### WHEELS

**Type** One-piece, 6-spoke plastic

### TIRES

Not included



**Left:** the Evo 2's front steering blocks are upgraded with new-formula plastics that are, according to XRAY, "designed to withstand the hardest impacts." Also new are the Evo 2's lower front suspension arms with optional shock-mounting positions.

**Right:** adjusting the XRAY's wheelbase is as easy as placing clip-on spacers on the arm's inner hinge pin. Note the setscrews used to secure the hinge pins.





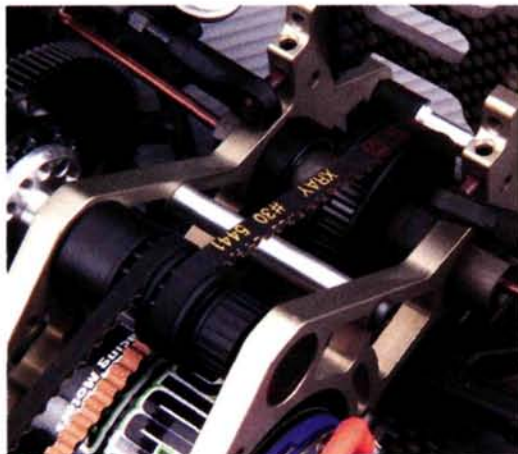
## KIT FEATURES

**CHASSIS.** Open the Evo 2's box, and the first thing you see is a gorgeous, prebuilt chassis. Unfortunately, it must first be disassembled to complete actual assembly, but seeing the graphite chassis and hard-coated Duraluminum bulkheads will get you juiced to build the kit. Those familiar with the T-1 will immediately notice that the Evo 2's new slotted graphite chassis can accept a 6-cell, side-by-side battery pack on either side of the car (or 12-cells for the really deranged) or a 3+3 saddle pack. The batteries are secured with graphite straps that are press-fit onto large ball standoffs on one end, thereby allowing the straps to remain attached to the car when they're unscrewed, and that have a knurled aluminum thumbscrew on the other end. A thin, new "flexible" upper deck is included, and it keys into slots in the Duraluminum bulkheads for a nice, tight fit. The Evo 2's upgraded bulkheads incorporate adjustable front and rear drive-belt tensioners that offer five tension settings. A foam bumper is included, but an optional transponder-mount foam bumper and upper graphite bumper brace must be purchased if you wish to use the forward transponder mount.

**DRIVE TRAIN.** The Evo 2 uses the same basic 2-belt design as the T-1's, but nearly all the components have been upgraded. Narrower, reduced-drag, Kevlar-reinforced drive belts are included with the Evo 2. The belts spin front and rear ball differentials that arrive with the thrust bearings partially assembled, and the diffs are full of good stuff; 12 carbide diff balls for each diff and thick, machined diff rings that provide ultra-smooth, long-lasting diff action. The ball diffs are externally adjustable and feature XRAY's "Labyrinth" snap-on plastic seals to protect the diff components from road grime. The diffs also include hard-anodized outdrives for increased durability.

An upgraded one-way bearing with exterior grooves to eliminate slip-page is installed on the center layshaft and is adjusted by tightening or loosening a plastic nut against the pulley that drives the front belt. The one-way allows the front wheels to freewheel off-power when set loose or provide varying degrees of full-time 4-wheel drive and braking when tightened. A hollow spring-steel layshaft runs through the one-way, and a machined-aluminum, pressed-on spur gear mounting flange provides a solid home for a genuine Kimbrough spur gear. The mounting flange is drilled and threaded with multiple mounting holes, and the spur is attached to the mounting flange with three screws, thereby eliminating the potential of a wobbling spur gear.

XRAY includes spring-steel universal drive shafts in front and rear, with snap-on plastic "outdrive savers" at the ends that prevent wear on the differentials' outdrives. The universal joints are attached to 10mm-diameter, hard-coated Duraluminum stub axles with integrated hex hubs. Wheels may be mounted perfectly true on the hubs because there are no axle pins or separate hubs to wobble or wear. The entire drive train spins on specially upgraded ball bearings with blue polyamide seals that have been



New ultra-thin, low-drag drive belts increase the Evo 2's drive-train efficiency. The upgraded, adjustable center one-way bearing is also visible, as is the hard-coated aluminum bulkhead with adjustable belt tension.

degreased and oiled with lightweight Aeroshell Fluid 12 oil (a high-performance lubricant from the aerospace industry) to provide as little friction and drag as possible.

**SUSPENSION AND STEERING.** The Evo 2 features an upgraded mono-post steering bellcrank with two mounting options for the inner pivot for varied Ackerman settings. The steering post is supported with an upper and lower ball bearing. Small plastic caps snap into both the lower chassis and upper deck, and the steering bearings are inserted in the caps to provide silky-smooth guidance for the steering post. A non-adjustable, spring-loaded servo-saver is incorporated in the steering post, and spring steel steering turnbuckles are connected to the steering arms via steel ball ends. The steering servo can be any standard-size or low-profile servo; I chose the Hitec 5925 MG digital unit. It's attached to the chassis with clean-looking, machined-aluminum servo mounts.

The T-1's buttery-smooth pivot-ball suspension is the recipient of Evo 2 upgrades as well. Upgraded front steering blocks are molded from more durable plastics. Both front and rear lower A-arms incorporate additional shock-mounting positions for extra tuning options, and both front and rear XRAY shock pairs are of equal length and may be built with either externally adjustable or fixed damping. A new "ultra tune" rear graphite shock tower offers a staggering 15 upper shock-mounting positions, while up front, the upgraded graphite shock tower allows for longer front shocks and larger tires than those on the original T-1.

Droop adjustments are easily dialed with adjustable droop screws threaded into the lower suspension arms, and captured hinge pins keep the suspension arms steady. The lower-arm hinge pins may be placed at one of three angles by adjusting the plastic hinge-pin holders on the bulkheads, which are adjustable with screws that go through the sides of the bulkheads. Caster is fully adjustable by sliding the front upper arms back

## BUILDING & SETUP TIPS

Building the Evo 2 is a delight; from its perfectly molded plastic parts and finely machined aluminum and spring-steel parts to its richly detailed assembly manual, most of the process was perfectly clear. Here are a few additional assembly tips.

**STEP 3—REAR SUSPENSION.** When I installed the wheelbase-adjustment clips, the 4mm clip bound up the suspension. XRAY instructs you to sand the clip if necessary (and it was, for my kit).

**STEP 10—BATTERY HOLDERS.** If you choose not to file the battery slots, do not stick the supplied foam battery cushions onto the battery straps. The manual explains this clearly, so pay attention; leave the foam strips off.

**USE THREAD-LOCK.** Don't forget to apply a dab of thread-locking liquid to any and all screws that thread into the aluminum bulkheads.

**USE A CALIPER.** Digital calipers are the best option, but even a slide caliper will help you measure and build

your Evo 2 more accurately. Use the caliper to measure and build all four shocks equally, as well as the steering and rear camber turnbuckles.

**SEAL THE CHASSIS EDGES.** After you've disassembled the pre-assembled chassis, seal the edges of the graphite chassis and upper deck with CA. Place a drop of thick CA on a cotton swab, and run the swab along the edges of the plates to seal them.

**READ AND USE THE EVO 2 SET-UP BOOK.**

The Evo 2 includes a highly detailed, comprehensive setup booklet. Take the time to read it thoroughly, as it fully explains each and every tuning adjustment on your Evo 2.

## YOU'LL NEED

- Transmitter and receiver
- Steering servo
- Electronic speed control
- Motor
- 6-cell battery pack
- Body
- Tires

## FACTORY OPTIONS

- Aluminum shock bodies—308320
- Aluminum rear arms—303115
- Front one-way differential, 34T—305100
- Ultimate spring set—308390
- Graphite upper holder for precut bumper—301214

\*Partial listing



and forth on their hinge pins and placing plastic spacer clips between the arm and bulkhead on the hinge pin. Nine millimeters of total wheelbase adjustments may be made by sliding the lower suspension arms fore and aft on their hinge pins and placing plastic spacer clips on the pins to keep the settings (this will also affect caster settings). Infinitely adjustable camber is the result of XRAY's front pivot-ball design; simply twist the pivot-ball screw in or out to alter front camber. Rear camber is adjusted with a twist of the rear upper camber link, and rear toe-in is adjustable with a twist of the lower rear pivot balls. Overall width can also be adjusted at both ends of the car as a result of the pivot-ball suspension.

**BODY, WHEELS AND TIRES.** As with most pure race cars, the choice of touring-car body is left to you. For my Evo 2, I chose an HPI Ford Mondeo ("Contour" in the U.S.) body painted by Josh Theil, and I mounted it on the chassis with the included foam-padded body mounts. The Evo 2 comes packaged with new, 6-spoke "Starburst" wheels that according to Team XRAY are molded from a more durable plastic composite than the T-1's original wheels. Tires are not included; I chose to mount Sorex 36R belts with Yokomo medium-foam inserts.

## PERFORMANCE

I ran the Evo 2 at Reflex R/C in Houston, TX, where the fast indoor asphalt track makes a great proving ground for any electric touring car. I've competed with my XRAY T-1 here many times, so Reflex's track was the perfect place to discover the differences in performance between the Evo 2 and the T-1.

I noticed immediately that the Evo 2 was more responsive to throttle inputs. I was aware of the difference after having raced a T-1 for several months without changing belts; my T-1's original belts had developed excess slack, and the T-1's tensioner-less bulkheads could not compensate. Thanks to the Evo 2's adjustable belt tensioners, I can maintain proper drive-belt tension over the life span of the belts. I was also impressed with the Evo 2's neutral handling out of the box. With the base setup dialed into my car, the car pushed slightly and never lost its composure. When the need arises to tune your Evo 2 to suit various track conditions, however, you can feel confident that the incredibly detailed and accurate XRAY Set-Up Book will guide you through every adjustment the car offers.

Mishaps that sent the car flying into the boards were my mistake, but the Evo 2 rolled away from crashes without taking a tweak. The new, flexible upper deck seems to add slightly more traction in the corners; my setup with the Evo 2 provides predictable on-power steering, whereas the same setup on my T-1 caused the chassis to chatter in corners. The Evo 2 feels slightly more forgiving yet maintains a very precise feel.

Overall, the car meets all expectations and easily exceeds all but the most talented drivers' performance capabilities.

## THE VERDICT

In a class in which suspension and tweak can make or break a competition touring car's on-track performance, the Evo 2 stands out as a leader. Racers who enjoy building and setting up their kits will be happy to know that the Evo 2's high-quality components have been engineered nearly to perfection. All the parts fit as perfectly as the engineers planned them to. I'm happy to see the Evo 2's upgraded belt-tensioner bulkheads as well as the many battery-placement options that the upgraded chassis now offers. Many wonderful electric touring cars are now on the market, but racers who appreciate precision, ease of building, accurate suspension adjustments and a clean overall chassis design have good reason to add XRAY's new Evo 2 to their racing stables this season.

**I NOTICED IMMEDIATELY THAT THE EVO 2 WAS MORE RESPONSIVE TO THROTTLE INPUTS.**

## LIKES

- Includes all of the T-1's popular option parts as standard equipment.
- Chassis accepts 6-cell side-by-side packs and multiple saddle-pack mounting positions.
- Perfectly machined and molded components make for a pleasurable building experience.

## DISLIKES

- Must purchase extra precut bumper and upper plate to mount transponder.
- Kit includes hold-downs for a saddle pack but not for 6-cell, side-by-side packs.

## LRP Quantum Competition ESC

This tiny, top-shelf ESC is packed with all the latest racing goodies and has only a 1-inch-square footprint. A low 5-turn motor limit, super-low on-resistance and external solder tabs are just a few of the reasons why this ESC found its way into my Evo 2.



Additional items used to complete the XRAY Evo 2

**Fantom Team Stock motor**

**SMC 6-cell matched batteries**

**Airtronics M8 transmitter and receiver**

**Hitec HS-5925MG digital servo**

**HPI Ford Mondeo 190mm body**

## SOURCE GUIDE

**AIRTRONICS** (714) 978-1895; airtronics.net.

**FANTOM RACING** (616) 649-9583; fantom-motors.com.

**HITEC RCD INC.** (858) 748-6948; hitecrd.com.

**LRP:** distributed by Team Associated (714) 850-9342; teamassociated.com.

**SMC** (540) 298-7706; smc-racing.com.

**XRAY:** distributed by Serpent USA (305) 639-9665; teamxray.com.

**YOKOMO USA** (949) 252-8663; yokomousa.com.

## THE COMPETITION

MODEL	CHASSIS	DRIVE TRAIN	SHOCKS	DIFFERENTIALS	AXLES	STREET PRICE	REVIEWED
Associated Factory Team TC3	Molded semi-tub	Shaft	Aluminum threaded-body	Ball	MIP CVD	\$300	12/01*
MRC Academy STR-4 Pro	Graphite plate	Shaft	Aluminum threaded-body	Ball	Universal	\$220	12/01*
SpeedMind Daytona RS	Carbon graphite	Dual-belt	Aluminum threaded-body	One-way/ball	MIP CVD	\$350	10/02
Tamiya TB Evolution II	Graphite plate	Shaft	Aluminum threaded-body	One-way/ball	Universal	\$419	8/02
Team Losi Triple-XS	Molded semi-tub	Single-belt	Aluminum	Ball	Universal	\$220	12/01*
<b>XRAY T-1 Evo 2</b>	<b>Graphite plate</b>	<b>Dual-belt</b>	<b>Plastic threaded-body</b>	<b>Ball</b>	<b>Universal</b>	<b>\$340</b>	<b>11/02</b>

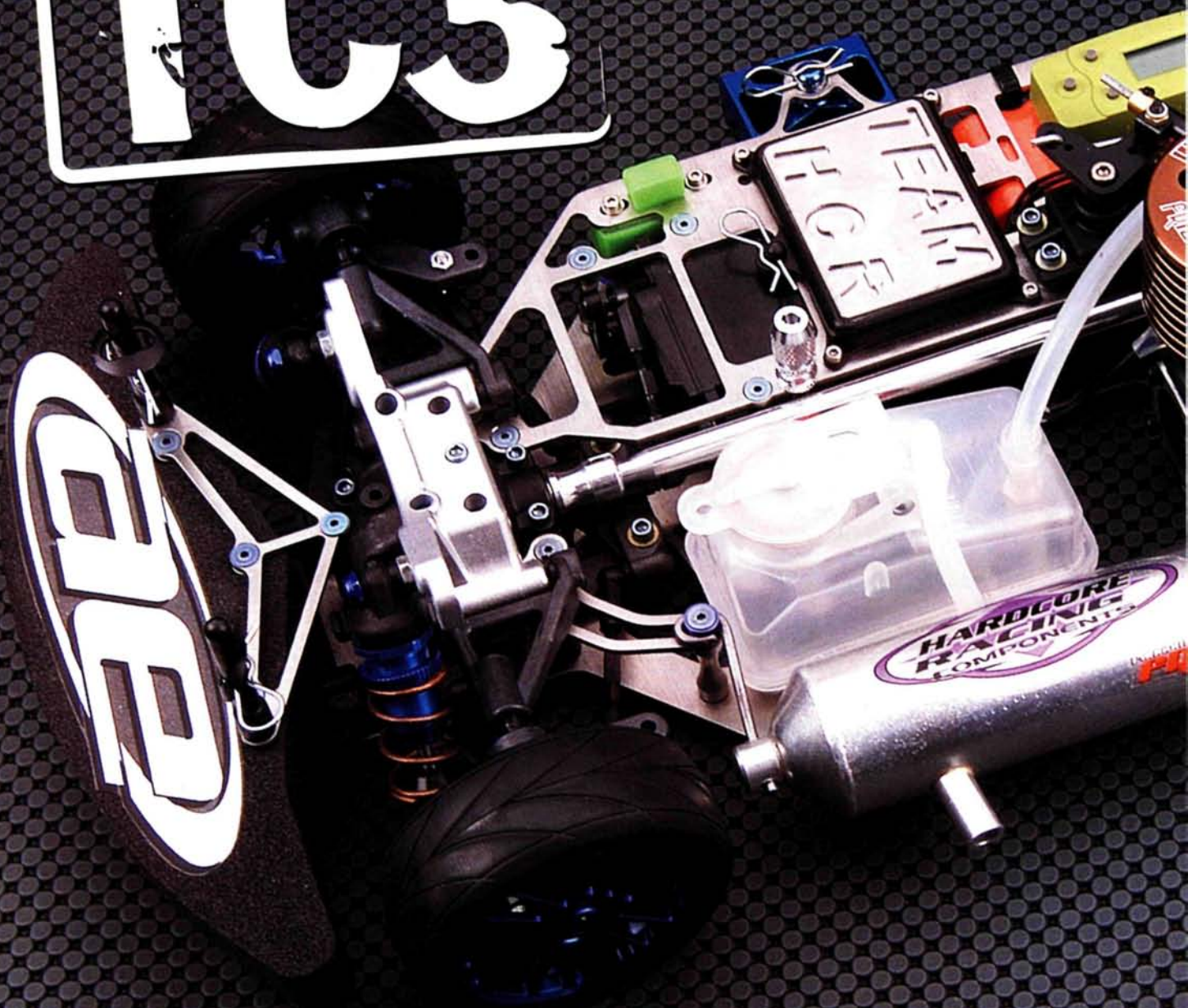
Partial listing; category is too large to include all vehicles. Price varies with dealer. \*Pro Touring Car Smackdown.







# PROJECT HARDCORE TC3



by the RC Car Action team

**E**VERYONE AND HIS BROTHER SEEMS TO BE IN the machined-aluminum-widget business these days, but Hardcore Racing Components was one of the first—and is arguably the best—at turning raw billet into beautiful RC art. And not just in aluminum; if you want titanium stuff, Hardcore is your

company. But as artfully crafted as their gear is, the HCR crew gets mighty upset if you accuse their parts of being just for looks; they take “hardcore racing” pretty seriously. As proof, HCR built up the Associated Nitro TC3 you see here; it’s fully outfitted with all the go-fast stuff in the HCR catalog,





## >> The Stuff

### HARDCORE RACING COMPONENTS

- Aluminum brake block—item no. HCR-02524, \$35.
- Ti brake rotor—HCR-02534, \$25.
- Aluminum drive cups—HCR-02574, \$21.
- Ti chassis—HCR-02604, \$145.
- Ti upper deck—HCR-02514, \$60.
- Ti screw kit—HCR-02490, \$80.
- Quasar rims—HCR-02211, \$49/pair.

### FANTOM

- FR12 side exhaust, slide-carburetor engine—F012-S, \$109.95.

### PRO-LINE

- Volkswagen Jetta 200mm—3121-00, \$23.

### RPM

- Super-duty rod ends—73360, \$4.95.

### SIDEWINDER

- Pro-race 20% nitro—\$19.99/gallon.

### TRINITY

- Team Kinwald dummy transponder—TK3077, \$14.99.

## ELECTRONICS

### JR

- R1 radio and receiver—JRP3140, \$399.95.
- Digital throttle/brake servo—DS8417, \$114.95.

### AIRTRONICS

- Digital steering servo—94755, \$114.95.

### DYNAMITE

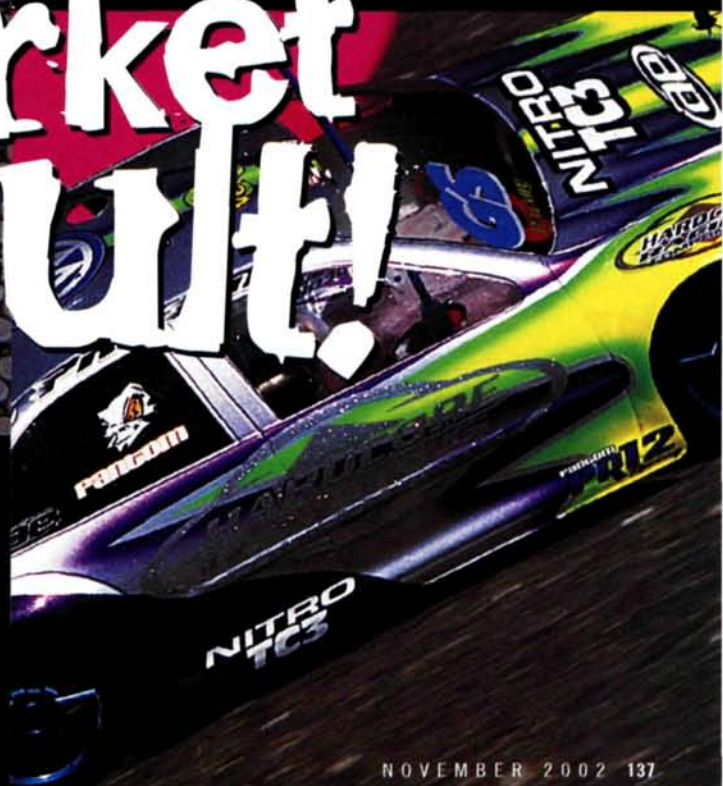
- 5-cell, 1000mAh NiMH receiver battery—DYN1415, \$39.99.

### VENOM

- Temperature monitor—VEN-0600, \$38.99.
- Fail-safe—VEN-0620, \$34.99.

# aftermarket assault!

from a titanium chassis kit to a set of aluminum (!) wheels. Sure, it looks hot, but Hardcore threw down the gauntlet and said its creation was a better TC3, not just a better-looking TC3. Wanna bet? To find out, we tested the HCR creation back-to-back with a stock Nitro TC3.







"The car seemed to put an even finer edge on the TC3's already quick handling."

## Performance

ALTHOUGH WE WERE most interested in the performance of the Hardcore TC3's chassis, it was the tire-baking rip of the Phantom FR12 engine that really got our attention. We expected it to be a perfectly OK engine but not a fire-breather. When it burbled happily to life at a rich idle with the first kiss of the starter wheel, it seemed to be just another decent sport engine. Then we got on it, and it was look-out fast! The FR12 had more bottom end than a Sir Mixalot video and just kept making power until it ran out of rpm. The only thing "sport" about the Phantom mill was the way it started easily and ran reliably throughout testing.

OK, the engine's good; let's get to the cars. We ran the stock TC3 first so we would have a fresh "picture" of the car's performance when it was time to drive the Hardcore ride. As we knew it would, the TC3 had plenty of steering and drifted predictably when we pushed it past the limits of the Pro-Line tires. Although it was very responsive, the TC3 is still easy to drive fast, with plenty of room for recovery if you make a mistake. The TC3's excellent braking was a huge plus as well; even relatively heavy drag-brake settings didn't cause fade. After running a few tanks through the TC3, we wondered just how the car could be improved, but we were sure going to find out.

It took only a few minutes to transplant the Phantom engine back into the Hardcore TC3, and

we were back on the track. The Hardcore car felt just like the stock TC3 as it cruised the track for final trim adjustments, but when we started pushing it, the car seemed to put an even finer edge on the TC3's already quick handling. Better drivers called the handling "more aggressive"; those who were less smooth called it "twitchy." We were surprised by the Hardcore car's seemingly quicker acceleration—especially since Hardcore's aluminum wheels were each a full 10 grams heavier than the stock TC3's Pro-Line hoops. Nonetheless, the titanium TC3 just seemed to have more yank; but we had to wait for the lap times to see just how that translated into tenths of seconds.

### THE RESULTS

The stock TC3 set the benchmark with an average "clean lap" time of 12.5 seconds and a fastest single lap time of 12.1 seconds. Notably, the lap times used to generate the 12.5-second average didn't stray much; just about all the laps were between 12.7 and 12.2 seconds.

The Hardcore car did prove quicker, with a single fastest lap of 11.8 seconds and an average lap time of 12.4 seconds. It's interesting to note that there is a larger gap between the fastest single lap and the average lap times of the Hardcore car; this makes sense, since the Hardcore machine did not turn its fastest laps as consistently as the stock TC3.

## How we tested

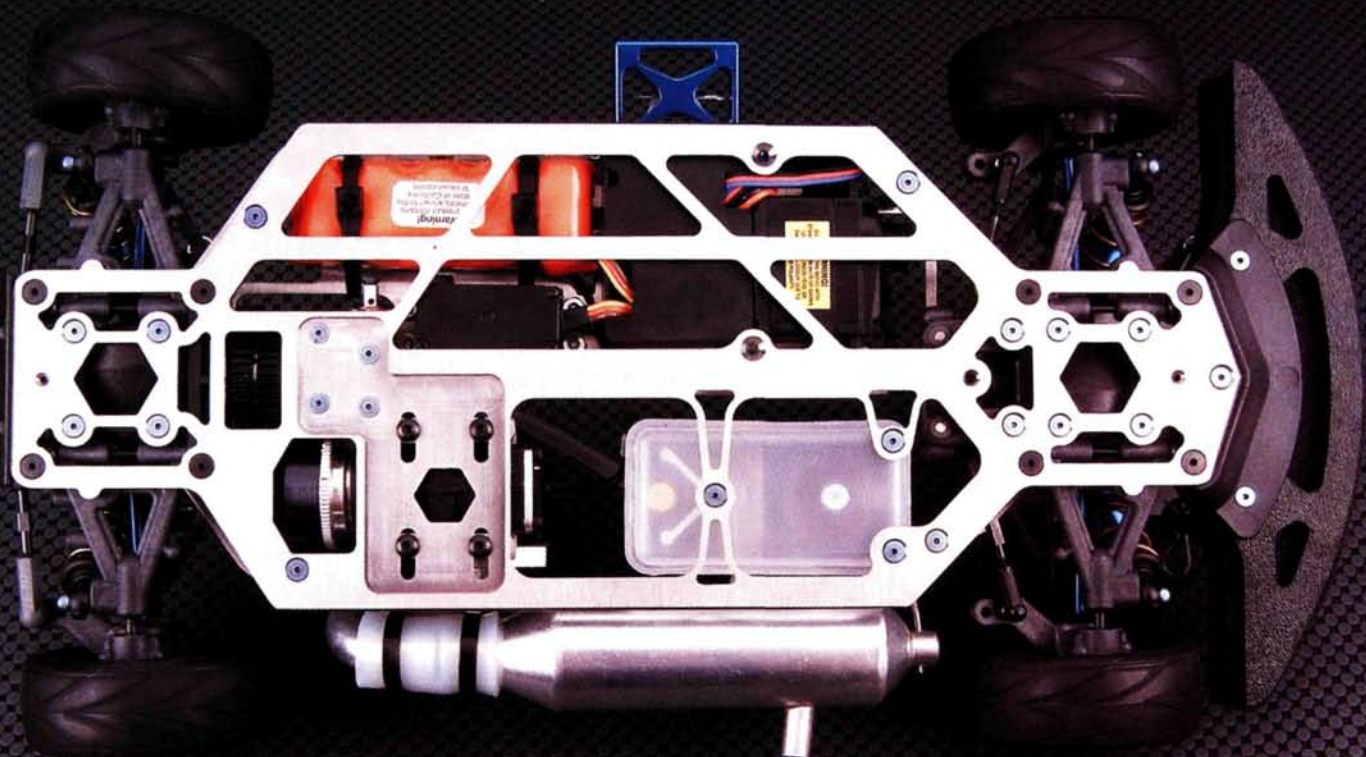
■ **Suspension setup.** Both cars were assembled with Associated's suggested rubber-tire setup, and the cars ran on Pro-Line V-Rage S2 tires with their included inserts. A Hudy setup system was used to confirm that both cars had identical toe, camber and droop settings.

■ **Horsepower.** We swapped the same Phantom engine between the stock and Project TC3 so both cars had identical horsepower, and we set the cars' transmissions to shift at the same points on the track.

■ **Electronics.** Both cars were equipped with identical servo and radio setups from JR Racing (see "The Stuff" sidebar for details).

■ **On the track.** Both TC3s were run on the same day, on the same course. Lap times were counted using a Team Orion Pro LCS, and each car was run until we were able to turn consistent lap times. The actual lap times were not revealed to the drivers until after all the testing had been completed.

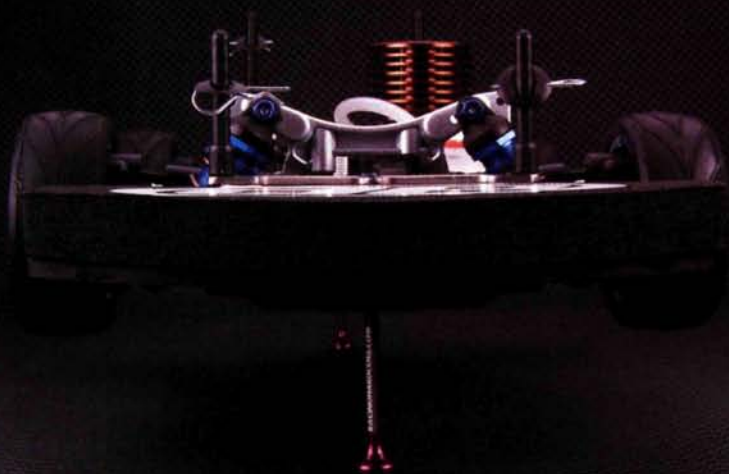




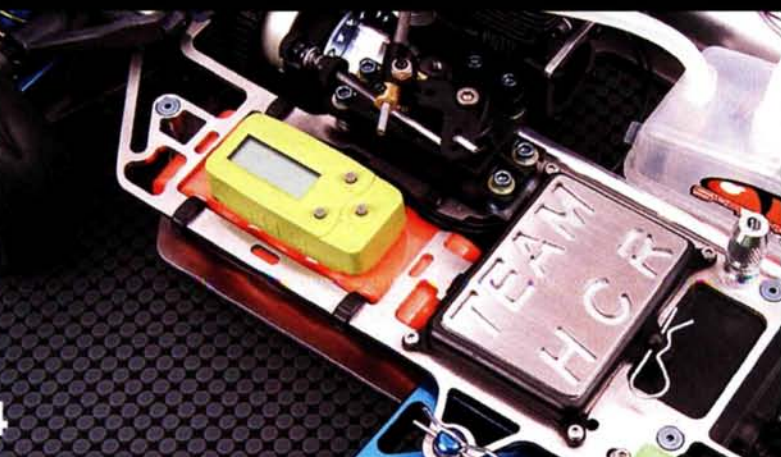
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1. Hardcore leaves a lot of the TC3 chassis on the shop floor; this thing is full of holes! The titanium's inherent stiffness means less material is required to deliver a suitably stiff chassis, and needless to say, the completed piece is very lightweight.

2. Hardcore says its Quasar aluminum wheels aren't just for style but are genuine performance parts, thanks to their stiff construction. Yeah, but can you bear to scratch them?

3. Hardcore sent along some trick aluminum golf tees so we could demonstrate how well balanced the chassis is. The tips of the golf tees are resting in the dimples at the front and rear of the chassis.

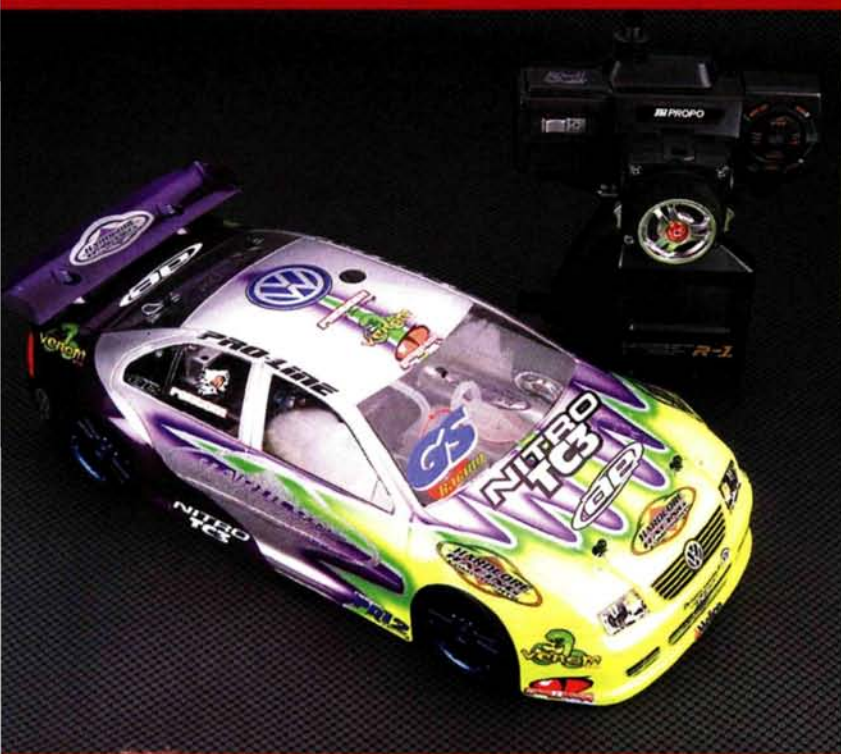
4. Venom's LCD gauge kept us informed of the Phantom mill's temperature from run to run.



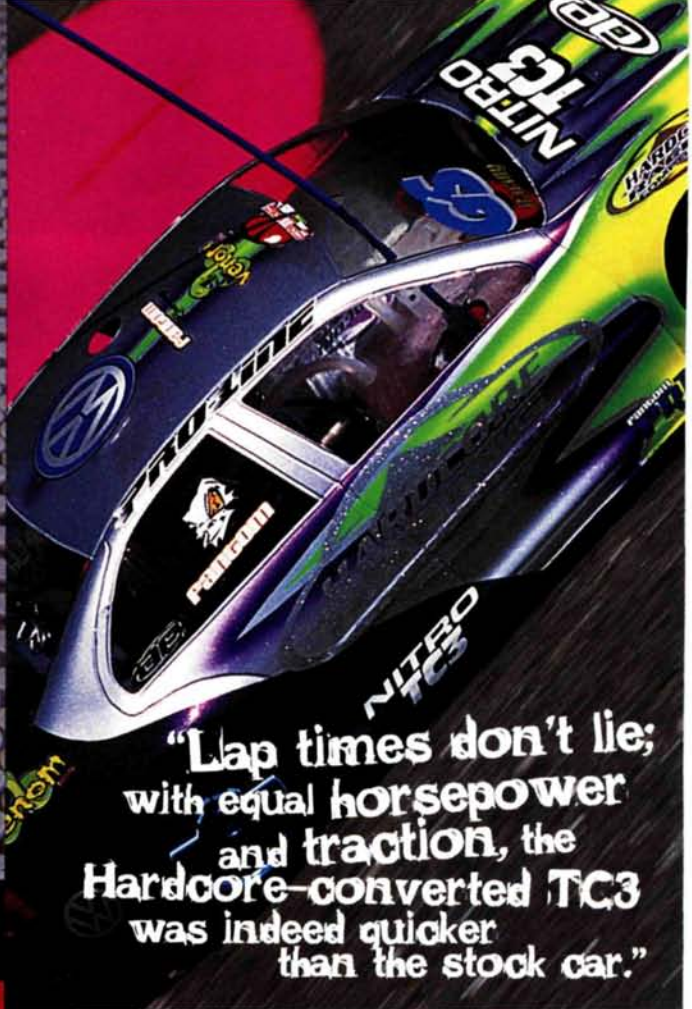


## Freaky Fantom

**THE HARDCORE GUYS** equipped their TC3 with a new Fantom FR12 side-exhaust, slide-carb engine that they claim produces 1.5hp and a max rpm of 41,700. The FR12 has the usual racing stuff: ABC construction, a machined connecting rod and heat-sink head and 10x19mm crankshaft bearings. An air filter and glow plug are also included, and the engine is available in pull-start and bump-start versions with a rotary or slide carb.



Hardcore hooked up the TC3 with JR R-1 radio gear and a Protoform Jetta body in official HCR colors.



### WHAT DOES IT ALL MEAN?

Lap times don't lie; with equal horsepower and traction, the Hardcore-converted TC3 was indeed quicker than the stock car. But don't think that going faster is a simple matter of bolting the Hardcore parts on; unless you're a skilled driver, you won't be able to exploit their benefits. In fact, you might actually increase your lap times, if the less forgiving Hardcore setup causes you to lose more time to spinouts or course corrections. Of course, you can always "de-tune" the car to make it easier to drive, but if that's your plan, you might as well stick with a stock TC3. The inverse is also true; you can dial in a stock Nitro TC3 to handle more aggressively if that's your driving style, but if the Hardcore parts made an otherwise identical setup faster, it stands to reason that any other setup would only get quicker with the addition of the Hardcore parts—as long as you have the skills to keep the car on the track. ■

### SOURCE GUIDE

- AIRTRONICS** (714) 978-1895; [airtronics.net](http://airtronics.net).
- DYNAMITE**; distributed by Horizon Hobby.
- FANTOM** (616) 649-9583; [fantom-motors.com](http://fantom-motors.com).
- HARDCORE RACING COMPONENTS** (661) 294-5032; [racinghardcore.com](http://racinghardcore.com).
- HORIZON HOBBY** (217) 352-1958; [horizonhobby.com](http://horizonhobby.com).
- JR**; distributed by Horizon Hobby.
- PRO-LINE** (909) 849-9781; [pro-lineracing.com](http://pro-lineracing.com).
- RPM R/C PRODUCTS** (909) 393-0366; [rpmrcproducts.com](http://rpmrcproducts.com).
- SIDEWINDER**; distributed by Morgan Fuels (800) 633-7556; [morganfuel.com](http://morganfuel.com).
- TEAM ASSOCIATED** (714) 850-9342; [teamassociated.com](http://teamassociated.com).
- TEAM ORION** (714) 694-2812; [team-orion.com](http://team-orion.com).
- TRINITY PRODUCTS INC.** (732) 635-1600; [teamtrinity.com](http://teamtrinity.com).
- VENOM** (949) 642-4363; [venom-racing.com](http://venom-racing.com).



BY GREG VOGEL & GEORGE M. GONZALEZ

## 3-PEAT FOR TEAM ORION'S RYAN CAVALIERI

Team Orion/Team Losi's youngest factory pilot, Ryan Cavalieri (age 16), TQ'ed all three of the modified classes and then went on to win the 2WD Modified class at the Hot Rod Hobbies 5th Annual Off-Road shootout. More than 400 drivers, including some of the best off-road racers in the world, competed at the event, and that makes Cavalieri's win even more significant. Cavalieri's teammate Doug Scripture TQ'ed and won both the 2WD and Truck Expert Stock classes, thereby earning Team Orion 2 more trophies.

Congratulations to Cavalieri and Scripture for their awe-inspiring performances.



## BOARD WALK

FROM THE  
RADIOCONTROLZONE  
.COM BULLETIN BOARD

### Discharge for how long?

**ACBOODUDE:** I was wondering what discharge rate to use when discharging a 1500mAh sport pack? And how long should it take to completely discharge the battery pack?

**HIGHROLLER:** For recreational use, I suggest using five 1157 light bulbs, which can be purchased at any automotive shop. You hook up the battery pack to the bulbs and discharge the pack until the lights dim. If you have a voltage meter, disconnect the battery pack from the bulbs when the voltage reaches 5.4 volts for a 6-cell pack. I use a 30-amp discharge rate on my racing packs and a 10-amp discharge rate (5 bulbs) for my sport packs. The time it takes to discharge depends on the load placed on the cells.

### Is Simple Green safe to clean our trucks?

**ATHLON:** I found some Simple Green in my garage and wonder whether it's safe to use on plastics and nylons. Does it require diluting? Thanks.

**MAXXBLASTER:** I hear that the new Formula 409 "Orange Power" cuts through nitro goo like there's no tomorrow.

**NWLEE:** Simple Green is great for tires; cleans them and actually makes them sticky!

**JETWEE:** I've found denatured alcohol to be the most effective and least expensive way to clean nitro-powered cars and trucks.

**BE HEARD!**  
LOG ON AT WWW.  
RADIOCONTROLZONE.COM

## Barry Baker crowned ROAR MOD TC CHAMP

Team Associated factory pilot Barry Baker proved unstoppable at the 2002 ROAR Electric On-Road Nats held at the MHOR RC Raceway in Aurora, CO. Baker not only TQ'ed the event, but he also went on to claim back-to-back wins in the A1 and A2 Mains to clinch the championship. Baker's teammate Mark Pavidis finished second, and Team Losi/Trinity driver Brian Kinwald claimed third. Baker's TC3 was on rails the entire weekend, and you'll be able to steal his racing setup because his ROAR Mod Nats-winning TC3 is featured in this month's installment of "Under the Hood." Stay tuned for the complete race coverage in an upcoming issue.



## SITE SEEING



### OCTMC.com.

If you own a Traxxas Maxx and live in Southern California, check out the Orange County T-Maxx Club and website. The site claims to be the home of "stupid air Maxxers," and it has a huge video archive of flying, soaring and jumping Maxx trucks, including Kyle Pipkin's Rocket Maxx that stole the show at the Pro-Line Maxx Challenge "Big Air" contest. Share tips and information with club members or join them at their next race; it will be held on a new home track in Anaheim, CA.

## Mini-Z Nationals!

Great Planes and Kyosho intend to implement a Mini-Z racing series and Mini-Z Nationals. Several regional races will be funneled down to a national championship that will be held in 2003 at Castle Hobbies in San Jose, CA. Castle has built one of the most impressive mini and micro RC tracks that we've ever seen. The modular track system, designed by racewayrc.com, has been erected on a raised platform and features banked corners, chicanes, low-height corner markers, bridges, overpasses and a Le Mans-style starting grid. Castle currently offers six racing classes: Sedan Stock, Sedan

Pro, Formula 1 Stock, Formula 1 Pro, Micro Stock and Micro Pro. For more information, give Castle Hobbies a call at (408) 377-3771 or log on to castlehobbies.com.

## Looking for Hot Bodies?

Hot Bodies hasn't actually picked up stakes and moved, but the company has changed its online address to [www.hotbodiesonline.net](http://www.hotbodiesonline.net) because it experienced problems with its old URL. Just be careful when you type in the new address; any other website that involves "hot bodies" probably has stuff in it that your girlfriend doesn't want you to look at!

## RUMOR MILL

### NEW TEAM ASSOCIATED B4 IN THE WORKS?

Rumor has it that Team Associated is currently working on a new 1/10-scale electric buggy project to replace the World Champion B3. Team Associated's representatives are extremely tightlipped about the project, but there's a good chance that a prototype will be unveiled soon. Stay tuned!



## SPEED SHOP



### JACO Nitro Shoes

Your nitro car needs a new pair of shoes? Check out JACO's new foam tire release developed specifically for high-powered nitro cars. Nitro Shoes are bonded to rigid, 5-spoke rims with cyanoacrylate to prevent them from separating at high speed, so you can worry about winning and not about your tires. The foam compound is available in a variety of shore densities to help you tune your car to specific track conditions.

Nitro Shoes—item nos. and prices vary with compound; \$16 to \$22.

Jaco (540) 298-7706; jacoracing.com.

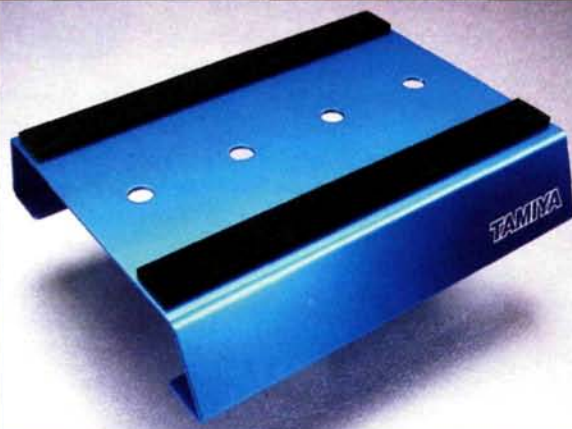
### TAMIYA Touring-car stand

Tamiya's blue-anodized aluminum car stand is a perfect addition to your pit area. Foam chassis pads and rubber feet prevent the car and stand from sliding, and four holes in the stand's top make handy shock holders.

An etched Tamiya logo is the finishing touch.

Maintenance stand—49224; \$23.50.

Tamiya America Inc. (800) 826-4922; tamiyausa.com.



### TRINITY Nitro Power receiver pack

Trinity's 650mAh, AAA, 5-cell Nitro-Metal-Hydride pack is about half the size of a pack of bubble gum (it measures just 1.8x1.1x0.8 inches) and weighs only 65 grams (2.3 ounces), yet it delivers a full 6 volts of power. A long receiver harness is included for easy installation in any vehicle.

AAA receiver pack—RC5307; \$29.99.

Trinity Products Inc. (732) 635-1600; teamtrinity.com.



### TRINITY VIS Ultra Metal packs

The latest go-fast packs from Trinity include Panasonic 3000mAh Ultra Metal NiMH cells that have been jolted with the VIS-Extra process to increase their voltage before being computer-matched for maximum power and run time and minimum internal resistance. Only the very highest-voltage cells land in Trinity's national-caliber Team packs; the cells that fall just short of the cut go into Race packs, for all but the highest levels of competition.

6-cell Team matched pack—NT3116; \$114.99.

6-cell Race matched pack—NR3116; \$99.99.

Trinity Products Inc. (732) 635-1600; teamtrinity.com.





## SPEED SHOP



### RIDE Tires, inserts and rims

Horizon Hobby now carries the full Ride line, including slicks and treaded tires in several compounds, shaped and color-coded urethane inserts and many styles of wheels. No matter what the track conditions, Ride has a tire, insert and wheel combo to hook you up.

Ride tires—item nos. vary with style; \$27.99 to \$29.99.

Ride wheels—item nos. vary; \$4.99.

Ride inserts—item nos. vary; \$9.99.

Ride Competition Parts; distributed by Horizon Hobby Inc. (800) 338-4639; horizonhobby.com.

### TAMIYA Wheel wrench

Tamiya's blue aluminum wheel wrench is lighter and more compact than a nut driver, and it's far easier to spin than the box wrench that's included with your kit. The small size also makes it easy to stow in your toolbox or tuck in your pocket for trackside wheel changes. The narrow tip fits easily into wheels with recessed nuts, and the knurled handle gives you plenty of torque to sock 'em down tight. 4mm wheel wrench (blue)—49227; \$12.49.

Tamiya America Inc. (800) 826-4922; tamiyausa.com.



## TRACK THREADS



Trinity's new Reflex/Reference shirt is looking good. It sports the Trinity Reference and TRC logos on the front along with a picture of a Reflex NT and Trinity's hottest motors: the P-94 and P2K Pro. On the back are Trinity logos overlapped by a large Reference Hazard symbol and on the sleeve, an RFX logo. If you run Trinity gear on the track, you had better sport Trinity gear in the pits, too.

Trinity Reflex/Reference shirt—RC9022 (L), RC9023 (XL), RC9024 (XXL), RC9025 (XXXL); \$16.99 to \$19.99.

Trinity Products Inc. (732) 635-1600; teamtrinity.com.

## LAST LAP

Would you like to see mini- and microcars become a fixture of the racing scene, or are they just for fun?

I would like to see a class emerge. It would allow a new group of people to become involved. The kits are relatively inexpensive yet high quality, and this would bring new people into the scene—not to mention that minis and micros are just plain fun anywhere, not just on a track.  
*Chris Wells*

Sure, why not? It's awesome just to drive them, but to race a mini-me (insert Austin Powers gag here) would be excellent. You could have an F1 spec class. I wish Kyosho would come up with NASCAR Mini-Zs. I think there are some serious possibilities in the minicar segment, and I would welcome a racing class for this sub-1/12-scale group.  
*Brandon Cook*

I would love to see them raced at national events. The microcars require a lot of throttle control, and that's what makes a good driver.  
*Stephen Sobottka*

Hey, if it's RC and it's fun, it should be raced.  
*Mike Zanghi*

I would definitely like to see both minicars and microcars have a race class of their own. All mini/microcars have been developed to be fun but also so they can be raced. With more models coming out, it's getting more people to buy these cars, and this means more people want to race them. But while racing them competitively, you have to remember to have fun.  
*Bryce Ryan*

### NEXT MONTH'S QUESTION

Which pro driver would you like to see racing full-scale cars, and which types of cars would they race? Matt Francis in a Desert Truck; Masami in an F1 car, or ...? Tell us who, what and why.

Respond by clicking "Last Lap" at [rccaraction.com](http://rccaraction.com).



## UNDER THE HOOD

**Barry Baker**

Team Associated Factory Team TC3



### RACE GEAR

**Radio system:** Airtronics M8

**Receiver:** LRP Phaser

**Steering servo:** Airtronics 94452

**Battery:** Panasonic Ultra-Metal 3000

**ESC:** LRP Quantum Competition

**Motor:** Reedy Ti 10-turn single

**Gearing:** 100/32

**Tires:** Sorex 36R

**Body:** Protoform Stratus II

SETUP	FRONT	REAR
Caster/rear squat	4 degrees	2 degrees
Camber	1 degree	1 degree
Toe-in/out	Out 5 degrees	In 2 degrees
Ride height	5mm	5.5mm
Ackerman	Standard	—
Bump-steer	0.064 shim under steering-block ball stud	—
Wheelbase	Short	—
Swaybar	0.063	0.063
Shock fluid	40WT	40WT
Shock piston	No. 2	No. 2
Spring	Associated Blue	Associated Silver
Upper shock mount	Middle hole*	Middle hole
Lower shock mount	Outer hole**	Outer hole
Inner camber link	Upper inside hole	Upper inside hole
Outer camber link	Outer hole	Outer hole

\* Rear shock tower installed up front

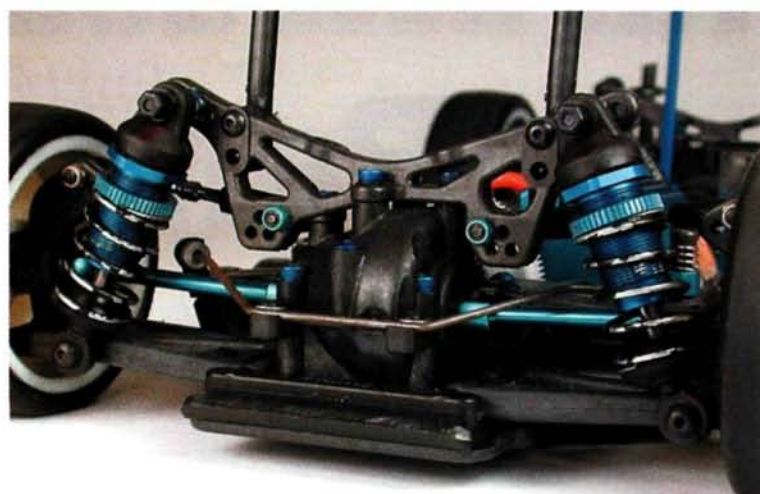
\*\* Prototype suspension arm

### FACTORY & AFTERMARKET OPTION PARTS

- IRS aluminum propeller shaft
- Dragon RC dummy cell spacer
- Front and rear swaybars
- Machined-aluminum motor-adjustment cam and clamp
- Radial clip-on heat sink
- Front diff spool

### MODIFICATIONS

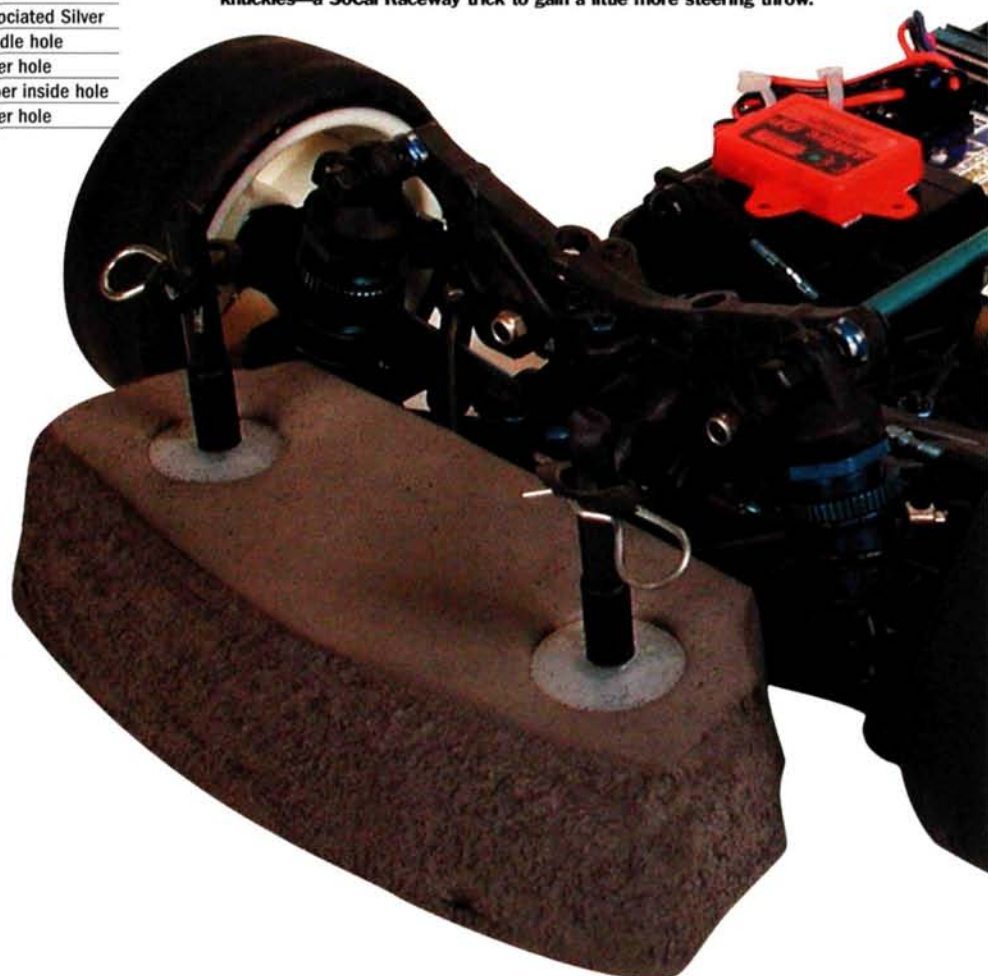
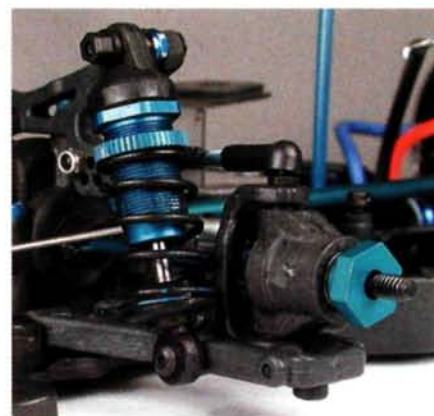
- Losi Triple-XS steering blocks
- TC3 rear shock tower mounted up front
- Lightened center drive cups
- Modified chassis



**Above:** looks like a typical Factory TC3 from this angle.

Those are the same Sorex hand-out tires as were used to win the ROAR On-Road Electric Nats. Barry used only two sets during qualifying, and that left him with two sets for the triple A-mains. Most of the racers used three sets of tires during qualifying. **Right:** Barry's TC3 is set up with new front suspension arms that feature one extra lower shock-mounting position. He also installed a rear shock tower in place of the front shock tower; this allows him to duplicate some of the setups he uses on his Nitro TC3.

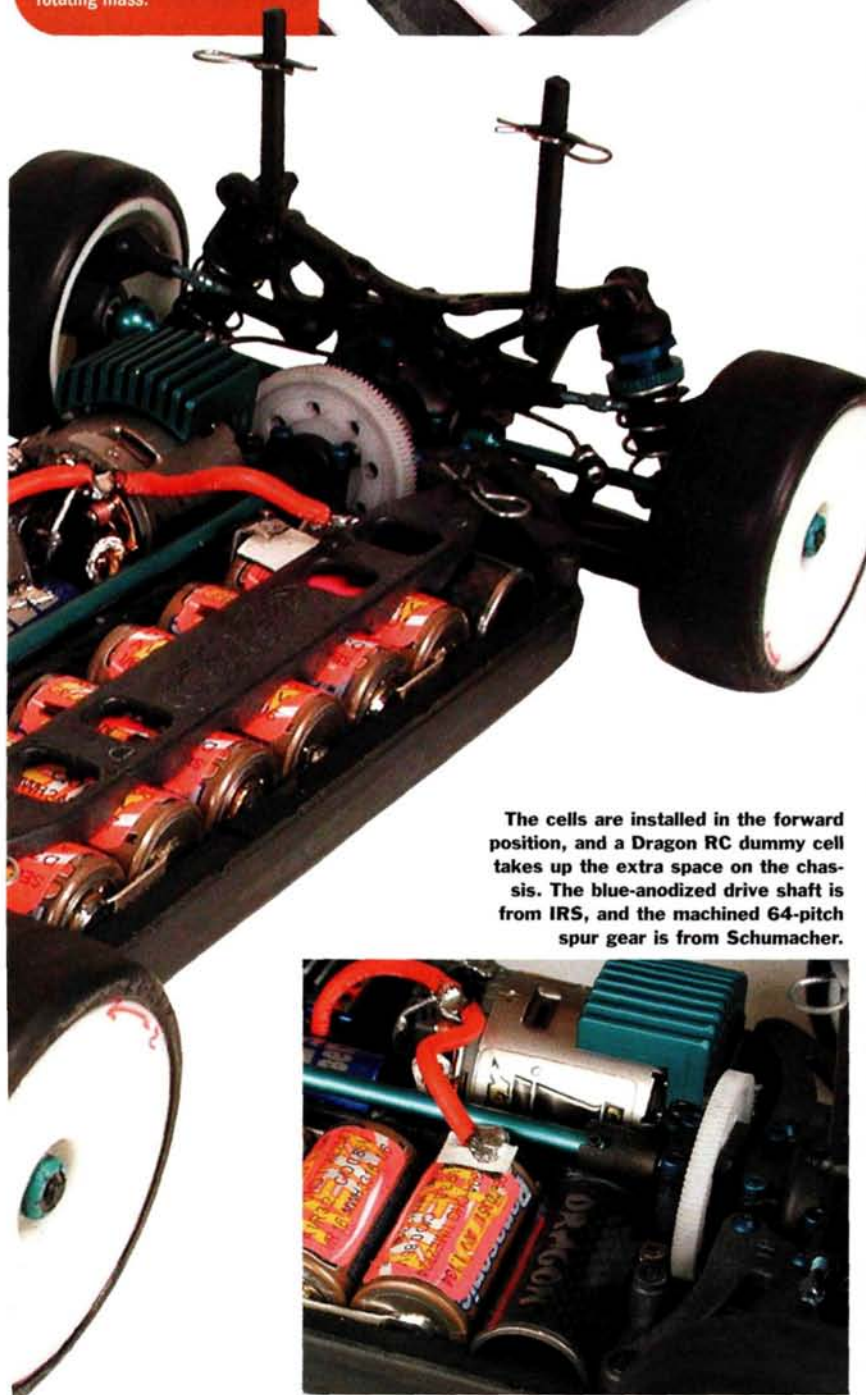
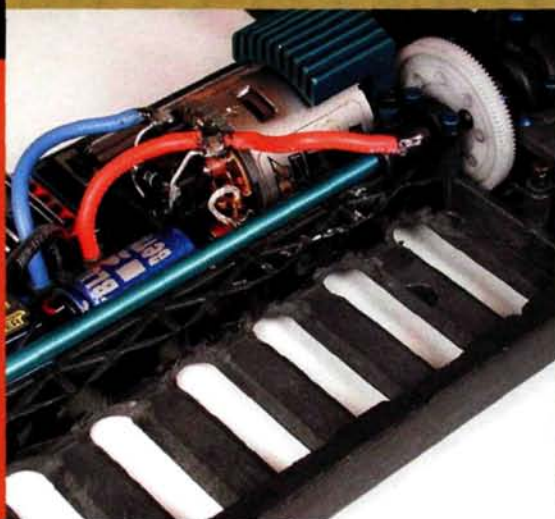
Barry's TC3 is also equipped with Team Losi Triple-XS steering knuckles—a SoCal Raceway trick to gain a little more steering throw.





## FACTORY DRIVER HOT MOD

Check out the Dremel work on the chassis. Barry ground away material from the center trusses and battery slots to allow the battery pack to be positioned lower and farther inward toward the chassis centerline. The foam strips glued to the chassis provide proper battery spacing yet keep the cells secure in the new location. According to Barry, this modification improves the TC3's transitioning ability. Looks as if the molded center drive cups got the Dremel treatment as well—most likely, to reduce rotating mass.



The cells are installed in the forward position, and a Dragon RC dummy cell takes up the extra space on the chassis. The blue-anodized drive shaft is from IRS, and the machined 64-pitch spur gear is from Schumacher.



# 5 QUESTIONS

**DRIVER:** Barry Baker

**AGE:** 32

**LAST BIG WIN:** 2002

Reedy Race, 2002

ROAR Nats

**SPONSORS:** Team

Associated, Reedy, LRP,

Airtronics, Pro-Line, Protoform, BRP, IRS, MIP, Hot Rod Hobbies and Stevos Products

When I'm not racing, I: chill with friends; play golf and billiards.



**RC CAR ACTION:** Looks as though you're getting up there in age, Barry. In a few more years, you'll be racing in the masters class [35 and over]. Do you think you'll be able to keep up with the latest generation of racers in a few more years?

**BARRY BAKER:** I'll probably have better odds in the masters class, but by that time, Joel Johnson and a few other really fast drivers will in the same class, too. No; I think I have a few more good years left in me.

**RCCA:** Are you superstitious? Do you have any rituals that you perform to get you ready for a big race?

**BB:** Not really—unless you consider it a superstition to have the same person in charge of placing my car on the starting grid. Kyle Skidmore, who was my pitman at the ROAR Electric On-Road Nats, definitely brought me luck. Come to think of it, Jeff Brown placed my car on the starting grid every single heat at the Reedy TC Race. I got pretty lucky there, too! All kidding aside, I know plenty of racers who follow some sort of ritual, but that isn't me.

**RCCA:** Here's the scenario: It's the A3 Main. Your teammate, Billy Easton, has the pole position, and your car is sitting on the slot right behind Billy's. You won the first Main, and Billy won the second, which means that the overall championship is riding on the conclusion of this race. What's your race strategy?

**BB:** Knowing that no other team could win the race, I would do everything in my power to cross the finish line first. If, for some reason, I made an aggressive pass and took Billy out, I would pull over to the side and let him regain the lead. I'm sure that Billy would do the same for me if the tables were turned. The good thing about this scenario is that Team Associated would win regardless of which team driver took home the trophy. That's always the number-one objective.

**RCCA:** How do you like working for Team Associated? Has being an employee influenced your recent success at the track?

**BB:** I was once just a sponsored racer, and now I'm an employee of Team Associated. It makes me very happy that our engineers and designers take my input so seriously—for instance, some of the front suspension changes that we've made. The TC3 was great before, but now it has proven unstoppable on the track. We also have an awesome race team. With Billy Easton, Mark Pavidis, Mike Blackstock and our most recent driver to join the team, Travis Amezcua [AKA "Peanut"], we've built a strong base that allows us to combine our talents. Yes, working for Team Associated has had a big influence on my success at the track.

**RCCA:** What do you like best about racing?

**BB:** RC racing has provided me with thousands of acquaintances whom I can count on at any time. I can travel anywhere in the world, and there will be true friends there who will open their homes to me. Friendships are what I truly like best about RC racing.



**THE COUNTRY'S BEST DRIVERS** converged on New Caney, TX, for the ROAR 2002 Modified Nationals, and they joined local talent to make this year's event one to remember. With high attendance, a challenging track and the support of K&M Racing Inc. and sponsors Team Losi, Team Associated and Lone Star Ford, the Mod Nats was a big success. Here's what went down.

by Paul Onorato



## Main Event Action

**Mod Buggy Champ: Brian Kinwald**  
**Top Qualifier: Greg Hodapp**

After dominating the first heat, Brian Kinwald appeared to be on his way to a certain win in the mod buggy class, but the second Main hurt his chances; he got hung up in an early crash and ended up in the fifth-place spot. In the last Main, he crossed the line third and just barely pulled out the win. Team Orion's Brian Dunbar came very close to edging out Kinwald, but he couldn't put together a final pass. And Hodapp? The class TQ rolled across the line in third.

**Mod Truck Champ: Dave Montgomery**  
**Top Qualifier: Dave Montgomery**

Dave Montgomery did Team Losi proud by bringing home two victories in the triple A-mains, thus backing up his inspiring TQ performance. The overall win was not an easy battle: Brian Kinwald and Greg Hodapp were breathing down his neck on every lap. Dave had to settle for third behind them in the first Main, but in the next two, Dave maintained his dominance to win the class. Kinwald and Hodapp finished in second and third.



**4WD Mod Champ: Brian Kinwald**  
**Top Qualifier: Greg Hodapp**

Brian Kinwald was in the zone and dominated the 4WD class with his Trinity-powered Triple-X4 prototype. Brian won the first two Mains to clinch the victory and earned the right to sit out the third Main while the other drivers battled for the lower podium steps. When the dust cleared, Rick Hohwart and Greg Hodapp had put their Peak-powered Losi's into the second and third spots.







# 2002

# ROAR MOD NATS

**SPONSORED BY:**  
**TEAM LOSI**  
**TEAM ASSOCIATED**  
**LONE STAR FORD**

***Big wins  
for Losi's  
Mod Squad***



PHOTOS BY PAUL ONORATO



Although they did not make the A-mains, these guys had a blast competing. I'm sure the disco ball helped!



Team Losi/Trinity driver Brian Kinwald was at the top of his game this weekend.

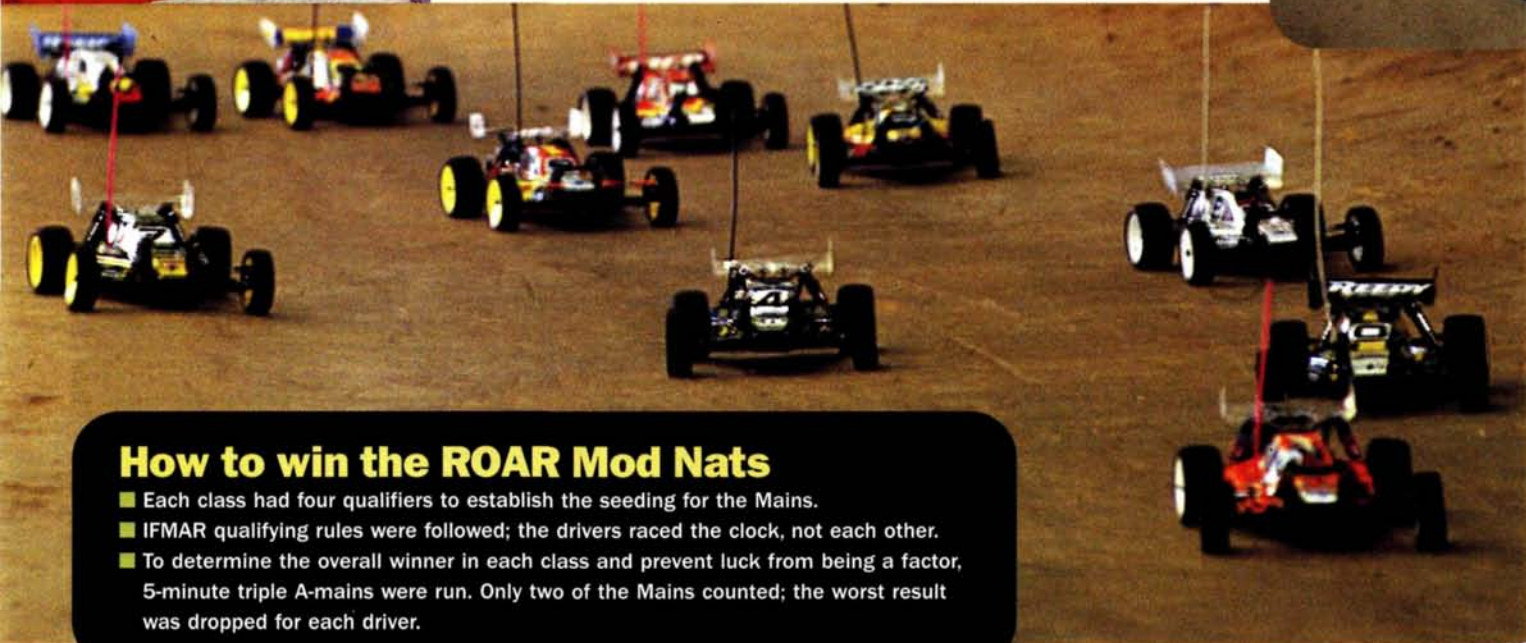
Greg Hodapp, the top qualifier for both mod buggy and 4WD mod, prepares his Triple-X for the next round of A-mains.



Mark Pavidis thumbs through the latest issue of *RC Car Action* during some downtime.



Below: new in the pits was this cool Stanley rolling workshop, which makes a perfect pit box for a weekend of racing.

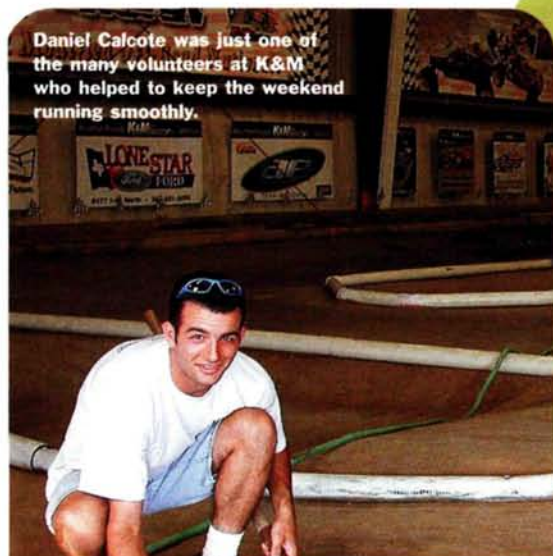


## How to win the ROAR Mod Nats

- Each class had four qualifiers to establish the seeding for the Mains.
- IFMAR qualifying rules were followed; the drivers raced the clock, not each other.
- To determine the overall winner in each class and prevent luck from being a factor, 5-minute triple A-mains were run. Only two of the Mains counted; the worst result was dropped for each driver.

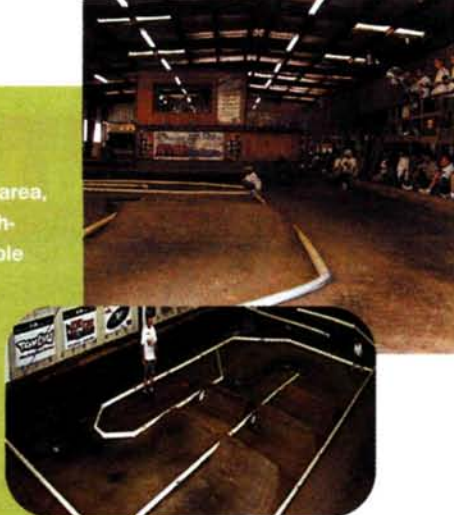


Daniel Calcote was just one of the many volunteers at K&M who helped to keep the weekend running smoothly.



## Blue groovin'

K&M packs a lot of track into a relatively small area, with lightning-fast straights, speed-robbing switch-backs, unsettling tabletops and challenging double and triple jumps. The hard-packed, smooth surface changed as the weekend went on. The groove at the beginning of the week was nearly nonexistent, but by Sunday's races, a very narrow groove had gradually been worn in. This made passing difficult for drivers and required precise timing and skill. The triple jump led to some of the biggest crashes of the event and provided the most action for spectators.



This monstrous stretch Ford Excursion was parked in front of the building to advertise the race weekend.



Freddy "Flattop," the pit mascot, was even in attendance. Nice nipples!

## Fair racing and family fare

The tone at K&M Racing is quickly set by the sign that greets you, which reads: "Absolutely No Foul Language, No Alcohol, No Drugs." According to track owner Brent Mahaffy, the driving force behind K&M is to encourage family values so kids have a worthwhile place to go and stay out of trouble. Brent has gone as far as to create an advisory board to get the community and local businesses involved in promoting the facility so more kids will discover it. Board member Jeff Kaiser has found that kids who are regulars at K&M have improved attitudes, develop mechanical abilities and are driven to reach their goals. This is also one of the few tracks that has an education program for beginners to help them quickly (and literally) get up to speed in RC.

Of course, having a topnotch facility helps, too; inside K&M, you'll find a well-groomed off-road track, a roadcourse-style on-road track, pit tables equipped with electricity for about 400 racers, a nicely stocked hobby shop and a snack bar. In addition to hosting the ROAR Mod Nats, K&M has hosted many other races, including the NORRCA Nationals as well as regional and state races.



## It takes teamwork!

Team Losi, Team Associated and Lone Star Ford were the three primary sponsors for this year's Mod Nats, with a handful of other companies contributing to the overall success of the event. They were:

- Gullo Auto Dealers
- JS Bodies
- Kart Zone
- Larry's Hobbies
- Lightspeed
- Racers Edge
- Robinson Racing Products
- Texas Mini Cart Association



# ROAR Mod Nats Winners



Mod Buggy winners (left to right): Greg Hodapp, third place, Brian Kinwald, first place, and Brian Dunbar, second place.



Mod Truck winners (left to right): Greg Hodapp, third place, Dave Montgomery, first place and Brian Kinwald, second place.



4WD Mod winners (left to right): Greg Hodapp, third place, Brian Kinwald, first place and Rick Hohwart, second place.

## Modified Buggy

FIN	QUAL	DRIVER	CHASSIS	MOTOR	BATTERY	ESC	RADIO	TIRES	BODY	RATIO
1	2	Brian Kinwald	Losi Triple-X	Trinity	Trinity	Novak C2	Airtronics M8	Handout	Losi	21:78
2	5	Brian Dunbar	Losi Triple-X	Orion	Orion	LRP V7.1	Airtronics M8	Handout	Losi Phobia	22:78
3	1	Greg Hodapp	Losi Triple-X	Peak	Peak	Novak C2	Airtronics M8	Handout	Losi Phobia	20:78
4	3	Mark Pavidis	Associated B3	Reedy	Reedy	LRP Quantum	Airtronics M8	Handout	Pro-Line Deja Vu Tu	18:81
5	6	Matt Francis	Losi Triple-XKE	Trinity	Trinity	LRP Quantum	Airtronics M8	Handout	Stock	23:92
6	7	Ryan Cavalieri	Losi Triple-X	Orion	Orion	Novak	Airtronics M8	Handout	Stock	24:92
7	10	Rick Hohwart	Losi Triple-X	Peak	Peak	Novak	Airtronics M8	Handout	Losi	21:82
8	4	Phillip Atondo	Losi Triple-X	Orion	Orion	Novak C2	Airtronics M8	Handout	Losi	21:78
9	8	Eric Willardson	Losi Triple-X	Peak	Peak	Novak Cyclone	Airtronics M8	Handout	Losi	20:82
10	9	Dave Montgomery	Losi Triple-X	Orion	Orion	LRP	Airtronics M8	Handout	Losi	22:78

## Modified Truck

FIN	QUAL	DRIVER	CHASSIS	MOTOR	BATTERY	ESC	RADIO	TIRES	BODY	RATIO
1	1	Dave Montgomery	Losi Triple-XT	Orion	Orion	LRP	Airtronics M8	Handout	Losi	17:86
2	2	Brian Kinwald	Losi Triple-XT	Trinity	Trinity	Novak C2	Airtronics M8	Handout	Losi	21:100
3	3	Greg Hodapp	Losi Triple-XT	Peak	Peak	Novak C2	Airtronics M8	Handout	Losi	18:86
4	8	Matt Francis	Losi Triple-XTMF	Trinity	Trinity	Quantum	Airtronics M8	Handout	Losi Fury	21:100
5	6	Scott Brown	Associated T3	Reedy	Reedy	LRP V7.1	JR R-1	Handout	Pro-Line GMC	17:87
6	5	Jason Corl	Losi Triple-XT	Orion	Orion	LRP V7.1	Airtronics M8	Handout	Losi Fury	20:100
7	9	Todd Hodge	Losi Triple-XTMF	Trinity	Trinity	Novak Cyclone	Airtronics M8	Handout	Losi	18:86
8	7	Adam Drake	Losi Triple-XTMF	Trinity	Trinity	Novak C2	Airtronics M8	Handout	Losi Fury	20:100
9	10	Billy Easton	Associated T3	Reedy	Reedy	LRP V7.1	Airtronics M8	Handout	Pro-Line GMC	17:87
10	4	Brian Dunbar	Losi Triple-XT	Orion	Orion	LRP V7.1	Airtronics M8	Handout	Losi Fury	18:88

## 4WD Modified

FIN	QUAL	DRIVER	CHASSIS	MOTOR	BATTERY	ESC	RADIO	TIRES	BODY	RATIO
1	2	Brian Kinwald	Losi Prototype	Trinity	Trinity	Novak C2	Airtronics M8	Handout	Losi	*
2	4	Rick Hohwart	Losi XX4	Peak	Peak	Novak	Airtronics M8	Handout	Losi	17:82
3	1	Greg Hodapp	Losi Prototype	Peak	Peak	Novak C2	Airtronics M8	Handout	Losi Prototype	17:90
4	3	Adam Drake	Losi	Trinity	Trinity	Novak C2	Airtronics M8	Handout	Losi	18:90
5	6	Jason Corl	Losi XX4	Orion	Orion	LRP V7.1	Airtronics M8	Handout	Losi	18:86
6	7	Rob Schaffer	Losi XX4	Peak	Peak	LRP	JR R-1	Handout	Losi	17:86
7	8	Ryan Cavalieri	Losi XX4	Orion	Orion	Novak	Airtronics M8	Handout	Stock	17:90
8	5	Brian Dunbar	Losi Prototype	Orion	Orion	LRP Quantum	Airtronics M8	Handout	Losi Prototype	16:90
9	9	Todd Hodge	Losi Prototype	Trinity	Trinity	Novak	Airtronics M8	Handout	Losi Prototype	18:90
10	10	Jimmy Babcock	Losi XX-4WE	Orion	Orion	LRP V7.1	Airtronics M8	Handout	Losi	17:84

\* information not supplied by driver

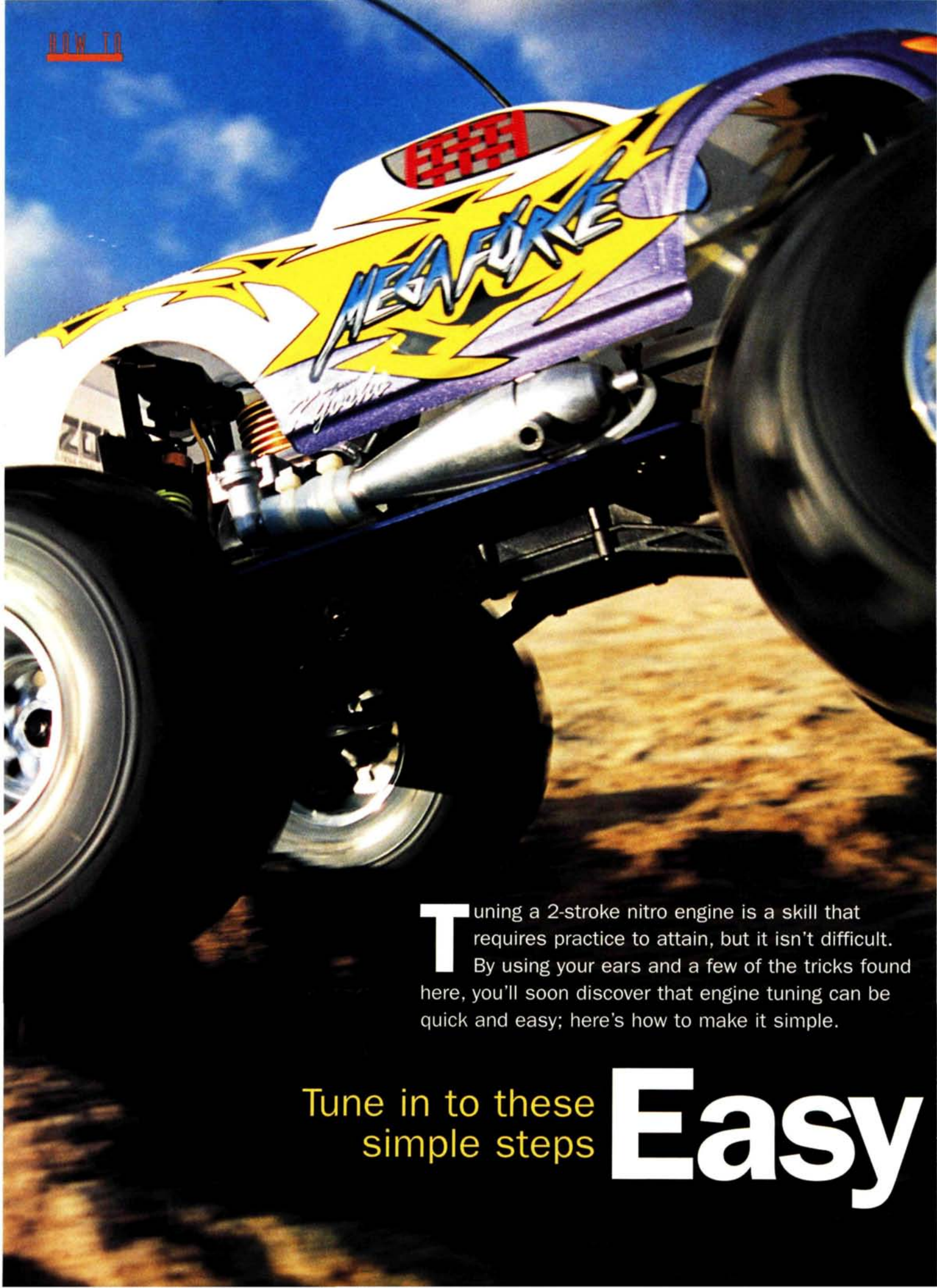
## WRAPPING IT UP

Congratulations to Brian Kinwald, who practically swept the event by winning both buggy and 4WD, only to fall shy in the Modified Truck class with a second-place finish. Dave Montgomery performed very well with a first-place result and a TQ in the Truck class. Greg Hodapp had an impressive weekend with two TQs for buggy and 4WD, and he came in third in all three classes.

Trophies were awarded to all of the A-main drivers and TQs; the rest of

the Mains awarded trophies for positions one through three. The three days of racing went on without any problems; this made it a fun race to compete in or just to watch. The competition may have been fierce, but the overall tone was friendly, with an emphasis on fun. A hearty pat on the back has to go to the staff of K&M Racing Inc., who put in a lot of hard work and were extremely courteous and helpful to all who attended, thus making this year's ROAR Mod Nats a huge success. ■





**T**uning a 2-stroke nitro engine is a skill that requires practice to attain, but it isn't difficult. By using your ears and a few of the tricks found here, you'll soon discover that engine tuning can be quick and easy; here's how to make it simple.

Tune in to these  
simple steps **Easy**



## Breaking in your engine

Engine break-in is one of the most critical points in a nitro engine's life span. For a comprehensive list of break-in instructions, check out "Engine super tuning" in the October 2002 issue of *RC Nitro*. Before you start, set your engine to the recommended factory settings found in your instruction manual. The settings are specified as a number of counterclockwise turns given to the needles after first "bottoming out" the needles by turning them clockwise (typically, three turns on the high-end needle and one turn on the low-end needle). When bottoming out the needles, twist them gently until you feel resistance and then turn them out the suggested number of turns. Here's a quick overview of what to look for when you break in your engine as well as what to avoid.

**GET THE ENGINE UP TO OPERATING TEMPERATURE QUICKLY.** The engine's first few minutes of running are its most critical; get engine temps up above 200 degrees F to properly heat the components. Run the car conservatively on the ground; don't just let it idle! Running the engine only at idle doesn't allow it to warm up sufficiently, and "cold" engines will wear prematurely. Tune the carburetor needles to bring temperatures up to around 200 F; you can test engine temperatures even if you do not own a temperature gauge by dropping a few drops of water on the head. If it sizzles a few seconds, it's tuned properly; if the water just sits there, turn the high-speed needle clockwise  $\frac{1}{4}$  turn until the water sizzles. If the water vaporizes instantly, the engine is too hot and you should richen the needle by turning it counterclockwise  $\frac{1}{4}$  turn until you reach the 200 F range.

**RUN THE ENGINE IN 2- TO 3-MINUTE CYCLES, RATHER THAN A TANK AT A TIME.** Shut the engine off between cycles to allow it to cool. Heating and cooling of the engine components, or "heat cycling," is what you're after. Before an engine has been heat-cycled, its components have not been mated completely. Heat-cycling will bring all of the engine's individual components up to temperature together and allow them to expand when heated and contract when cooled. After several rounds of heat-cycling, the components will have the best fit for maximum performance and longest wear.

**DON'T GO FULL THROTTLE FOR SUSTAINED PERIODS.** Vary the engine rpm as you drive your vehicle for break-in, but don't go full throttle any longer than a two-count, and don't clamp the throttle so hard that you can hear the trigger "clack" against the transmitter housing; squeeze it nice and easy. Jabbing the throttle violently can put extra stress on the parts that you're carefully mating during the break-in process, so easy on the trigger finger is the way to go.

**DON'T GO TOO LEAN TOO SOON.** Getting the engine too hot from an excessively lean fuel mixture will damage its components as quickly as running the engine too cold. To avoid hurting your new mill, keep a close eye on its temperature. Keep the engine below 210 degrees during break-in to avoid a too-lean setting. Again, you can test the engine's temperature with a temp gun or the water-droplet test.

Now that you've properly broken in your engine, you're ready to tune it for best performance. >>>



If you don't have an eye-dropper handy, just use a section of fuel tubing to place a droplet of water on your engine's heat-sink head. By noting how quickly the drop evaporates, you can estimate the engine's temperature.

# engine tuning

by Stephen Bess



**Step 1. Set the idle screw.**

It's found on the side of the carburetor and is usually the only exposed screw on the carb body. The idle screw prevents the engine from shutting down by keeping the carburetor slightly open when the throttle trigger is returned to neutral or the brakes are applied. Turn the screw in, and it opens the barrel; turn the screw out, and it allows the barrel to close further. Set the idle screw so that the carb remains open 1 to 2mm when the brakes are applied. Although you'll adjust your idle-

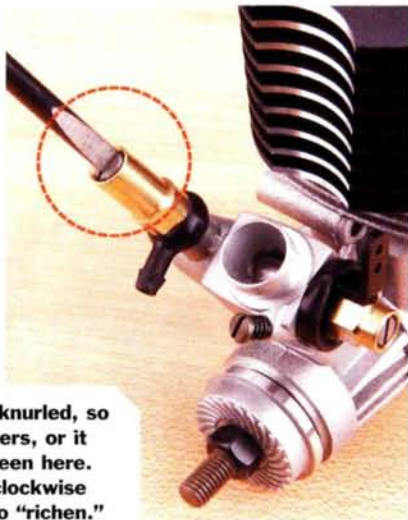
screw setting less frequently than the other needles, it isn't unusual to retune the idle screw once your engine has been fine-tuned for best performance, or during extreme weather changes.

Set the idle screw so the carb opening is about 1mm, even when the throttle is at neutral or the brakes are applied.

**Step 2. Tune the high-end needle.**

Before you start adjusting needles, run your car for 2 or 3 minutes to warm it up. You should never tune a cold engine, as the initial mixture settings will change as the engine heats to its operating temperature. Once the engine is warmed up, lean the top-end needle  $\frac{1}{8}$  turn ("leaning" the needles always means turning the mixture needle clockwise to reduce the amount of fuel in the fuel/air mixture; tuning the needles "rich" is the opposite). Run the car for 2 or 3 minutes and note its performance; repeat until the car accelerates crisply from its midrange rpm to top speed. You'll know your high-end needle is close to ideal when any midrange acceleration hesitation ceases, and your car accelerates from mid- to top-end rpm quickly. If your engine is tuned properly, it will sound like a crisp "BwaaaaAAAAAA!" at top speed; if the engine is set too rich, it will sound more like a muffled "Bwaaaerrrrrr." A lean-running engine may have the same signature sound to the untrained ear, so it's important to keep an eye on engine temperature as well. Cooler temps (200 degrees F or below—water won't boil off the head in a water-drop test) indicate the mixture is too rich, and hotter temps (above 250 F—water instantly vaporizes on the cooling head) indicate a lean mixture. A properly tuned engine has a clean revving sound and expels plenty of blue smoke out of the exhaust pipe. The upper temp limit at this stage depends on the engine, but anything over 250 F is likely to be on the lean side. Over time, the signs of a rich or lean mixture will become more obvious, as you learn the sights and sounds of a properly tuned engine, but watching engine temps is a good indicator for those new to tuning nitro engines.

The high-end needle may be knurled, so you can turn it with your fingers, or it may have a screw head, as seen here. Remember, turn the needle clockwise to "lean," counterclockwise to "richen."

**Step 3. Tune the low-speed needle.**

Not all engines have this needle (some RTR and entry-level engines have only a high-end-mixture needle), but assuming your engine does

have a low-speed needle valve, adjust this needle next. With the high-speed needle adjusted properly, you can now tune the carburetor's low-end needle for snappy acceleration from a standing start to midrange speed.

**HOW TO TELL WHEN IT'S TOO RICH.** With the engine fully warmed up, accelerate from a standing start and pay close attention to what happens. Do the engine's rpm bog down or quit running completely?

The low-end needle must be adjusted with a screwdriver. If you're not sure what to use for a starting setting, try adjusting the needle so the screw head is flush with the carburetor body.

Does the engine sound like a "Bwaaaauuerrr" when you punch the throttle? If so, the low-speed needle is too rich; lean the low-speed needle  $\frac{1}{8}$  turn and repeat the acceleration test. Continue leaning the low-speed needle  $\frac{1}{8}$  turn at a time until your vehicle idles smoothly and accelerates crisply without dying out.

**HOW TO TELL WHEN IT'S TOO LEAN.** If the low-speed needle is set too lean, the engine will idle quickly and attempt to accelerate, but it may stall from fuel starvation. Do not mistake this stalling with a too-rich low-speed needle setting; unlike a too-rich setting, this overly lean setting resembles more of a stuttering machine-gun sound, wherein the engine revs and "misses." This "missing" is a sure sign of an overly lean, hot needle setting; richen the low-speed needle  $\frac{1}{8}$  turn and retest until acceleration is strong and smooth with plenty of exhaust smoke.

**THE PINCH TEST.** You can also pinch-test the low-speed needle's settings. Although not as accurate as performance results, the pinch test tells you when your settings are getting close to ideal. With the engine idling, pinch the fuel line anywhere between the fuel tank and the engine, and hold it until the engine dies. The engine should increase rpm gradually and stall out in a few seconds. If the engine takes more than a few seconds to stall and its rpm increase very slowly, the low speed is set too rich. If the needle setting is too lean, the engine will stall quickly, and the rpm may not rise much at all.



It isn't a precise test, but you can get a sense of how close your low-end needle setting is by pinching the fuel line and noting how the engine's idle changes.

**Stay tuned**

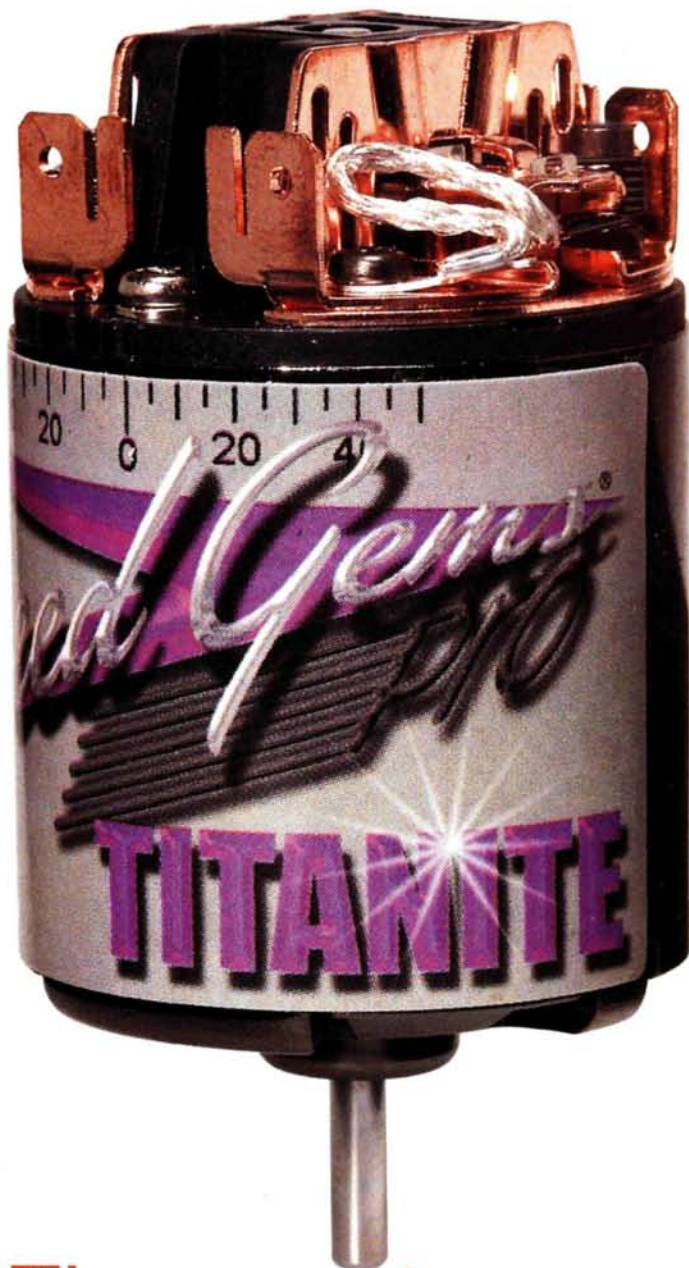
The guidelines detailed here will get you well on your way to tuning-master status, but never underestimate good ol' experience; the more you tune your engine, the better you'll become at tuning it. And don't be afraid of those carburetor needles; if the last twist seemed to hurt performance, just turn the needle the other way! ■



# Trinity Speed Gems Pro

by Steve Pond

**T**rinity's Speed Gems modified motors have been favorites of electric RC enthusiasts for more than a decade, thanks to a combination of low price, high power and a selection of winds to suit a wide variety of applications. After a mild revamp of the Speed Gems 2 line, Trinity has reached deep into the bag of high-tech tricks pioneered with the D4 and P-94 hand-wound modifieds to deliver its all-new Speed Gems Pro motors. This third generation of Trinity's best-selling, modified-motor line sports the most advanced motor technology ever available in the Gems series, and it's certain to be Trinity's best-performing machine-wound lineup to date—but that's the dyno's story to tell.



The most powerful



## FEATURES

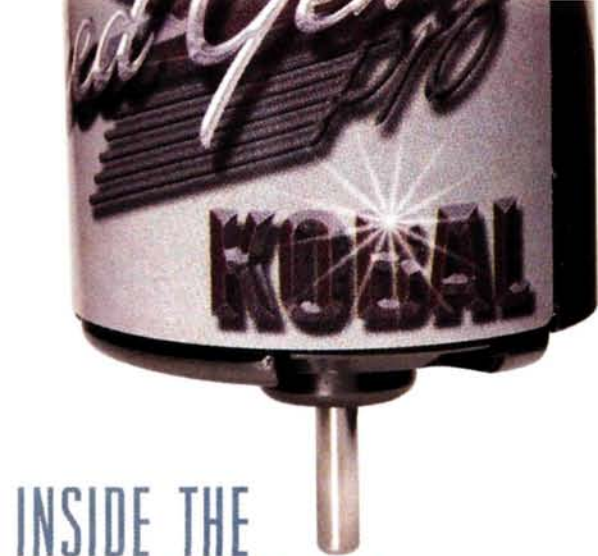
- A stronger, more uniform D4 can design. The thickness and uniformity of the motor can translate into a stronger magnetic field, which means more power.
- High-torque armature from the D4 hand-wound modified motors.
- Stronger FB-6 magnets are the same magnets as those from the previous generation of D4 hand-wound modified motors, and they're considerably stronger

than those included in earlier Gems motors.

- The current P-94 endbell has been designed for all-out competition and features highly-efficient copper brush hoods and taller, wider brushes for more overall power and efficiency.
- Includes three factory-installed, surface-mounted capacitors; no soldering required.







## INSIDE THE SPEED GEMS PRO

The new generation of Speed Gems motors takes advantage of the brush and endbell design that was developed for Trinity's high-dollar, hand-wound P-94 modified motors. The brushes are the core components; they're wider and taller than standard brushes but not as wide as the oversize brushes that were briefly in vogue a few years ago (Trinity's P-94 brushes measure 4.45x5mm; the older design was 5x5mm). According to Trinity, the larger brushes provide optimum contact with the commutator and energize all three comm segments through 97.5 percent of each revolution to increase power and efficiency. By Trinity's measure, standard brushes in conventional modified motors only energize the comm 83 to 88 percent of each revolution.



The armature of the Speed Gems Pro comes straight from the previous generation of hand-wound, D4 modified motors. Its full-crown design generates more torque than split segment armatures.

## Gems mods yet!

Trinity also claims that its big-brush advantage improves with time. When the comm is cut during regular maintenance, the diameter is naturally reduced, and that improves the "wrap" of the brushes; consequently, the length of time that all segments of the armature are energized nears the ideal 100-percent mark. The larger brushes are also claimed to last three to five times longer.

The endbell features built-in, surface-mounted capacitors, so you won't have to install them. And unless your ESC requires a Schottky diode, the Gems Pro's are ready for installation with no soldering required. Additionally, the brush hoods and heat sinks are copper, and that's a better conductor of electricity than most alloys used on other motors. The brush hoods also have overhead vibration dampers to prevent brush chatter at high rpm.

The motor can is from Trinity's D4 and doesn't have side vents; Trinity has put vents only in the endbell and the bottom of the can. This more solid can increases the strength of the magnetic field, and that means more punch off the starting line. Also borrowed from the D4 design are the Gems' FB-6 magnets; they're a big step up from those used in previous Speed Gems motors. They're much stronger magnets and are identical to the type used in Trinity's D4 hand-wound modified motors.



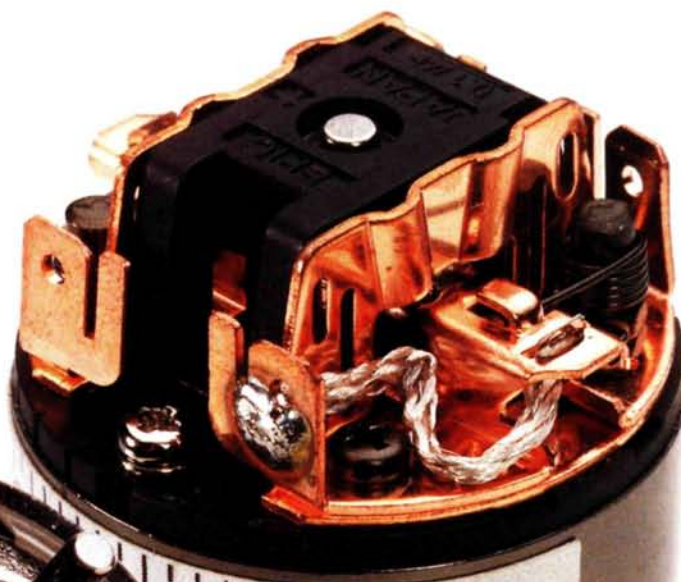




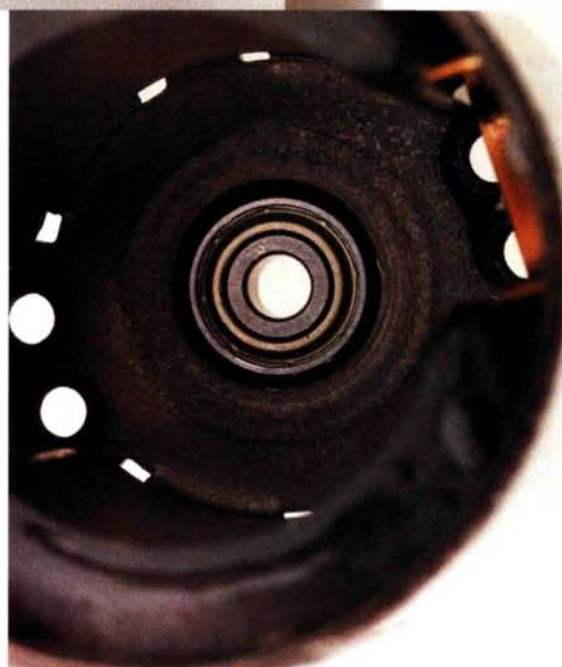
The endbell features built-in capacitors under the endbell hardware, so they don't need to be soldered into place.

The heat sinks and brush hoods are copper, which is a superior conductor compared with the aluminum components used for most motors. This improves efficiency and reduces heat by allowing current to flow through with less resistance.

The only vents in the Speed Gems Pro motors are in the bottom of the endbell. The lack of vents in the outer surface of the motor's can means there's a stronger magnetic field, and that translates into more torque on the track.



Ball bearings are standard for the Speed Gems Pro motors, as are the stronger FB-6 magnets from the D4 modified motors.



## DYNO TESTING

All of the current motors in the Speed Gems Pro lineup are listed here. Each has been tested exactly as it came out of the package, with one notable exception: the timing. The production motors came to us with each endbell set at 0 degrees timing. It's common knowledge among motor builders and tuners that some degree of advanced timing is very beneficial for all aspects of performance.

Changing the endbell timing is as simple as loosening the endbell screws, rotating the endbell counterclockwise and retightening the screws. That takes about 10 seconds, and it goes a long way toward maximizing performance. See the sidebar "Speed secrets" to find out exactly how much better the performance can be with a couple of minor tweaks.

MOTOR	WIND (TURNS x STRANDS)	MAXIMUM POWER (WATTS)	MAXIMUM TORQUE (NEWTON MILLIMETERS)	MAXIMUM EFFICIENCY (PERCENTAGE)	MAXIMUM AMP LOAD	MAXIMUM RPM
Amber	17x2	173.7	204.8	79.4	109	31,423
Titanite	15x2	191.5	203.9	82.5	124.2	33,784
Kobal	13x2	200.1	202.5	79.9	126.3	38,671
Jet	11x2	203.7	172.7	74.9	119.6	45,370
Cryptonite	9x2	219.3	167.5	75.5	139.2	51,621



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## DYNO TEST



This graph shows the dramatic difference between an out-of-the package motor and one on which the commutator has been cut and the timing increased to 20 degrees. ■ The dotted line shows the initial results obtained from the Amber 17-turn motor as it came from the package. ■ The solid line shows a dramatic increase in most areas of performance after its comm had been cut and its timing increased. We recorded an increase of more than 3,900rpm and 44 percent more power overall.

## SPEED SECRETS! Two simple steps to more power

Two relatively simple and inexpensive steps can produce profound performance increases in your machine-wound modified motor.

**ADVANCE THE TIMING.** Unscrew the endbell screws just enough to allow the endbell to be rotated, and rotate the endbell counterclockwise to the "20" mark on the label. That's it. Twenty degrees of advanced timing is usually the sweet spot for most motors, and this is what can give you the greatest increase in power output.

A few words of caution: if you like to drive in reverse for extended periods, this advanced timing setting may damage the motor or bring your reversing speed control to its amperage limit and cause the speed control to stutter or shut off. If you use reverse for only a moment or two to back away from obstacles, the advanced timing won't damage anything.

**CUT THE COMM.** As with many other budget modifieds, the Gems Pro's comm is going to be

slightly out of round because it's not trued (cut) on a lathe after being pressed onto the armature. This can cause a loss in performance due to brush bouncing. If you don't have access to a comm lathe, your hobby shop may be able to cut your comm for a nominal charge or direct you to a racer who can do the job for you. It's worth it.

What exactly do these two relatively simple tasks get you in terms of performance? How do 3,900 more rpm, 10 percent more efficiency and a whopping 44 percent more power output grab ya? The combined results are staggering given the relative simplicity of the tasks, and the biggest gains come from the easier of the two—bumping the timing. The more time-consuming task of cutting the comm accounts for less than 10 percent of the power gain. It's all about the timing. Just don't fall into the trap of thinking more is better; 20 degrees of timing is the point at which most mod motors are happiest. Any more timing than that will cause power loss, overheating and generally poor performance. Keep it between 15 and 20 degrees, and your motor will make maximum power.

The new line of Speed Gems motors is certainly an improvement over the previous generation. The R&D behind Trinity's hand-wound racing modifieds has trickled down into its budget modified motors. The Pro motors outperform the previous generation of Speed Gems motors yet cost the same as the older design. They are even more affordable than a competition, stock-class motor with bushings. That's a tough value to beat.

**THE VERDICT**

**SOURCE GUIDE**

**TRINITY PRODUCTS INC.**  
(732) 635-1600; teamtrinity.com.



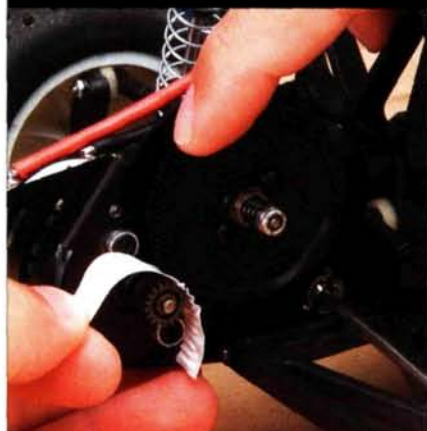
# Avoid the **top 10** beginner mistakes

Become a  
smarter RC  
guy today!

by Gary Katzer

## Mistake 1. Setting the gear mesh too tight.

For your car's drive train to work effectively, a slight amount of backlash needs to be between the gear faces. Without this gap, the meshing of the gears causes excess drag, heat and wear. Set the gear mesh so there is just a "tick" of play between the gears. You can eyeball it, or try this classic trick: slip a piece of notebook paper between the gears, press them together, then tighten the engine or motor-mounting screws. Remove the paper, and your gear mesh should be perfect.

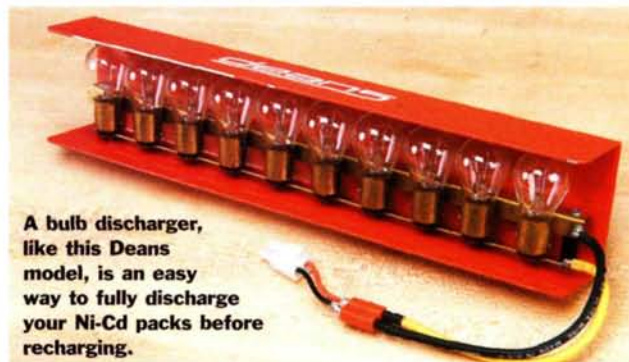


A slip of paper can help you set the gear mesh properly.

## Mistake 2. "Topping off" batteries.

If you don't completely drain down your car's Ni-Cd battery before you recharge it, it will eventually develop a "memory" and not charge to its full capacity. Before you recharge your battery, make sure it is fully depleted by running your car until it slows to a crawl or by plugging it into a discharger, such as the unit shown here

from Deans. Always let your battery cool completely before you recharge it; this will give you maximum run time, and it helps the battery last through many charge/recharge cycles. If you have the latest nickel-metal hydride (NiMH) batteries, you may safely charge them without fully depleting them, but be warned: if you aren't using a peak-detecting charger, you could very easily overcharge the pack and damage it. Get in the habit of completely discharging your packs before you recharge them, no matter which type of batteries you use.



A bulb discharger, like this Deans model, is an easy way to fully discharge your Ni-Cd packs before recharging.



## Mistake 3. Overtightened wheel nuts.

If your car's front wheel nuts are too tight, there won't be enough clearance between the nut and bearing for the wheel to turn freely. At the very least, this will make the motor or engine work harder than it has to, and it will affect handling because the car essentially has "front brakes" on. If you really overdo it, you could damage the wheel bearings. Always give your wheels a test-spin after reinstalling them, and back off the wheel nuts if they bind.

Don't over-crank those axle nuts! Once the nut is snug, give the wheel a test-spin, then back the nut off if you feel any drag.



This Futaba Magnum Junior transmitter has independently adjustable throttle endpoints (red arrows) and a dual-rate steering dial (yellow arrow) to adjust the steering servo's throw.

## Mistake 4. Too much servo travel.

Turn the transmitter's steering wheel from full left to full right, and note what happens as your car's front wheels steer. If the steering servo still tries to push the steering bellcranks after the parts have reached the limits of their travel, the servo and the steering parts are being subjected to unnecessary strain. If your transmitter has endpoint adjustments ("adjustable travel volume" settings, for Futaba owners), or an adjustable dual-rate function, use it to limit the servo's travel so the binding is eliminated (check your transmitter's manual to see if it has these functions). If you run a nitro car, also check the throttle servo to be certain it isn't trying to force the carburetor open beyond its "full throttle" setting.



If your transmitter doesn't have adjustable endpoints, you can mechanically reduce linkage servo throw by simply moving the linkage to a hole that is closer to the servo's output shaft.



### Mistake 5. Routing wires and fuel tubing over drive-train components.

Wires and fuel tubing don't play well together with spur gears. Take the time during assembly to route excess wiring away from any moving parts in your car. Gears, belts, drive shafts and other moving parts can damage servo or ESC wires. A spur gear can easily chew a hole in your electronics wire or fuel tubing, causing fuel to spill everywhere (a mess) or your car to careen out of control (a bigger mess). If your battery wires are damaged or severed, your car could simply lose power, or the battery may short out and damage the battery, the car, or both. You can easily bundle your wires away from moving parts. Zip-ties are your friends!



**Careful!** This fuel line is dangerously close to the flywheel; if it gets buzzed, there'll be a messy fuel leak.



The Peak Stratos motor on the left has built-in capacitors (arrowed); the motor on the right has soldered-on caps. Both do the same job, and caps are a must for glitch-free running.

### Mistake 6. No capacitors on the motor.

Many of the latest motors are equipped with factory-installed, surface-mount capacitors, but other motors still require two or three 0.1uf capacitors (also known as "caps") to be soldered to them. The required caps are usually included with the motor, and most electronic speed controls also include them just in case your motor doesn't. A capacitor helps control the electrical "noise" created by the motor's brushes and commutator. Your local hobby shop can help you install the capacitors properly.



Whether you use a rechargeable receiver pack or alkaline cells, it's important to keep the batteries fresh.

### Mistake 7. Never checking the receiver pack.

You nitro car's drive train is powered by an engine, but battery power is required to operate the receiver and servos. Without a fully charged receiver battery, your expensive car can lose control and cause major damage to itself and whatever it hits. Make sure you protect your investment by fully charging your receiver pack before you hit the track for the day. If you use alkaline batteries, check them each day before you run (many include a built-in test strip; use it!). Slow throttle or steering movement also indicates that your receiver batteries should be recharged or replaced.

### Mistake 8. Using old fuel.

You wouldn't drink milk after the expiration date, would you? Then don't let your engine use fuel that sat in a damp basement for five months. RC fuel begins to break down after time, losing much of its lubricating ability. Old fuel will cause your engine to idle rough and start hard and to leave it all "gunked up." If you have gallons of fuel that you never use up, start buying smaller bottles. Your engine will thank you.



One way to avoid fuel-storage issues is to avoid storing fuel! Don't buy more fuel than you can use in a month; small bottles like this pint container from Megatech are perfect for a short day at the track.

### Mistake 9. No gasket on the glow plug.

Without the small copper gasket under the glow plug, performance-robbing air can seep into the engine's combustion chamber. The gasket also slightly raises the bottom of the glow plug; without the gasket, the plug sits lower in the combustion chamber than it should be. In extreme cases, the top of the piston might even collide with the bottom of the glow plug when the piston is at top dead center. The copper gaskets most often go missing when the plug is removed to clear out a flooded engine. Always make sure that the gasket is still there when you reinstall the plug.



The copper-colored gasket must be installed on the glow plug, or the engine will perform erratically—if at all.



Pro-Line's Dirt Works (left) design is an all-purpose fun tire, while the Hole Shot (right) is a racing tread for hard-packed conditions.

### Mistake 10. Wrong tires for the track.

This mistake isn't a biggie—your car will still run if the tread patterns you choose aren't ideal—but picking the right tires is critical to get the most performance from your vehicle. If you run off-road in "soft," sandy conditions,

choose tires with larger, taller lugs. If you plan to race, talk to the fast guys at the track to see which brands and tread patterns they run, or speak to the hobby-shop owner. He should be able to tell you which treads are the most popular for his track. Still in the dark? Dig out your manual. Most contain a tuning guide on the last few pages that may include recommendations for tires and inserts depending on track surfaces.

Now that you've learned how to avoid the common beginner mistakes, you're on your way to RC-master status. The more you wrench and race, the more you learn. Above all, remember: it's all about having fun. And keep reading *RC Car Action*!

### SOURCE GUIDE

**FUTABA;** distributed exclusively by Hobbico/Great Planes Model Distributors Co. (800) 637-7660; futaba-rc.com.

**PEAK PERFORMANCE** (714) 692-8533; peakmotors.com.

**PRO-LINE** (909) 849-9781; pro-lineracing.com.


**W.S. DEANS CO.** (562) 634-9401; wsdeans.com.




## Testing New Era's RC10GT .21 conversion kit

**B**igger is always better—especially when it comes to engines. I don't want the Civic Si; I want the Mustang 5.0. I don't want the XR250; I want the XR600. And as you might expect, I don't want a .15 in my truck when I can have a .21. That's why I jumped at the chance to put together a big-block Associated RC10GT with the help of New Era's conversion chassis and assorted option parts. The kit couples big-block power with the most popular nitro racing truck to deliver a wheelie-popping good time. Here's what the New Era kit includes, and what it's like to take it for a spin.


**CHASSIS.** The base of my GT is New Era's double-deck aluminum chassis. The bottom is constructed of 3.2mm-thick aluminum plate. All the holes on the bottom have been countersunk to prevent the screw heads from becoming hung up on debris. Seven aluminum posts support the upper aluminum deck. The upper deck is home to the fuel tank, throttle/brake servo and receiver. It's designed to use a larger capacity 1/8-scale fuel tank to feed the hungry .21 engine. The throttle/brake servo is mounted on the left side of the chassis instead of the usual right-side configuration. I added New Era's steel-tube roll bar to protect the engine's heat-sink head. It's constructed of chromoly steel tubes and has been powder-coated blue to prevent it from rusting. It's attached to the chassis with the stock screws.



Check out that chassis; its double-deck design makes it ultra stiff, and it sure needs to be, with all that power bolted into it.



**ENGINE.** The engine is held in the chassis with a custom CNC-machined aluminum engine mount. New Era includes a special clutch nut, bearings and a clutch bell with the conversion. The exhaust gases flow through a short, 90-degree header and into a New Era tuned pipe. Even with a big engine sitting in the chassis, there's sufficient room to move it from side to side so you can adjust gear ratios and gear mesh; I stuffed a pull-start O.S. RGX .21 off-road engine into my truck.



Talk about a tight squeeze. That big engine has just enough room to fit into the chassis.





## Parts list

### TEAM ASSOCIATED

RC10GT Factory Team—item no. 7060, \$279.99.

### ELECTRONICS

#### HITEC

- HS-425BB Deluxe servo—31425BBS, \$14.99.
- Lynx 3D radio—123271, \$189.99.

### DRIVE TRAIN

#### ROBINSON RACING

- Idler gear—2213, \$13.95.
- Steel machined spur gear—2365, \$36.50.
- Lightened-aluminum slipper kit—1515, \$30.
- Titanium one-piece top shaft—1512, \$17.95.
- Hardened-aluminum diff gear—1513, \$17.50.

### SUSPENSION

#### NEW ERA

- Control arms (F/R)—AGT333/AGT334, \$31.50.
- Shock towers (F/R)—AGT430/AGT431, \$19.50.

### CHASSIS

#### NEW ERA

- .21 conversion kit—AGT205, \$144.
- Front bumper for Factory Team & RTR—AGT322, \$18.75.
- Blue steel-tube roll bar with brace—AGT910U, \$31.50.

### BODY

#### PARMA

- Sudden Impact Monster Jam monster truck—10148, \$29.99.

### WHEELS

#### NEW ERA

- Polished rear aluminum wheels—AGT4052R3, \$49.
- Polished front aluminum wheels—AGT452F, \$49.99.

### TIRES

#### PRO-LINE

- Trac-Ta-Gator—1045-00, \$15.
- Speed Paw—1047-00, \$15.

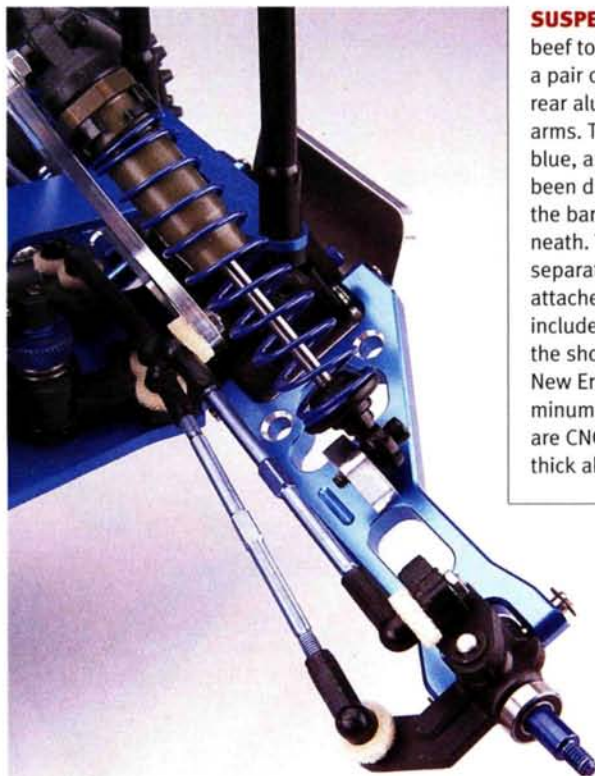
### ENGINE AND ACCESSORIES

#### O.S.

- RGX engine—13612, \$179.99.

#### NEW ERA

- High-torque ripple pipe—AGT301, \$29.95.
- Header for .21 engine—AGT502, \$18.95.



**SUSPENSION.** I added some beef to the suspension with a pair of New Era front and rear aluminum suspension arms. They are anodized blue, and the edges have been diamond cut to reveal the bare aluminum underneath. The shock mounts are separate pieces that are attached to the arms with the included screws. The tops of the shocks are mounted to New Era's front and rear aluminum shock towers. They are CNC-machined of 3.2mm-thick aluminum plate.

## IT BREAKS EVERY RULE IN THE BOOK .... BUT IT SURE IS FUN TO PLAY WITH.



Look at the finish on those wheels! That's how they come straight from the factory. Not bad, eh? I glued some meaty Pro-Line tires to the front and rear rims for the ultimate traction.

**DRIVE TRAIN.** I knew the transmission on my GT was going to take a beating, so I strengthened it with Robinson Racing gears. The slipper and spur gear ride on Robinson's lightweight, super-strong titanium top shaft. All the torque from the engine is transferred from the top shaft to the diff through a small idler gear. The stock composite idler will never hold up to the power of a .21 engine, so I replaced it with a steel idler gear from Robinson. Of course, I also replaced the stock composite diff gear with a lightweight aluminum one from Robinson. It's hard anodized to reduce wear.

## Performance

I packed up my GT and headed down to the local hobby shop for some hot laps on the dirt track. I left the truck's gearing stock so I could see what a difference the .21 would have on acceleration. All you have to do is blow on the trigger and the tires light up; it takes a little finesse to get the truck to go in a straight line. I was able to get the truck to hook up a little by loosening the slipper clutch; taller gearing will also calm things down. Boy, is this truck fast! It gets a little hairy at top speed; the tires balloon like crazy and make the truck skate all over. Slowing it down is also an experience; the extra weight of the big-block engine is hard on the single-disc brake. I thought for sure that the truck would lean to the left when I jumped it because of the engine's extra weight, but the GT was surprisingly well balanced in the air.

This truck totally rocks! It's too hairy to race (and it breaks every rule in the book, anyway), but it sure is fun to play with around the yard. It's also a real attention-getter; every time I fire the truck up and peg the gas, somebody hollers "Holy crap!" That's good enough for me.



## TRICK TRUCK STUFF

### THUNDER TECH RACING

#### Wheel-wideners for the Tamiya Clod Buster, Bullhead and Juggernaut 2

Thunder Tech Racing has come up with an easy way to add stability to your monster truck. These new wheel wideners increase the truck's overall width by  $\frac{3}{4}$  inch, and they are CNC-machined of black Delrin. Thunder Tech claims that the wheel wideners actually tighten the truck's turning radius by moving the tires away from the truck's suspension arms so you get more travel. The kit includes four wheel wideners, four long-reach nuts and lock washers.



Wheel wideners—DEL-CB01, \$45.

### NEW ERA TXT-1 skidplate

Check out these badass skidplates from New Era. They are made of 2.5mm-thick aluminum plate and designed to fit over the existing servo mount/axle guard. That big hunk of aluminum will be able to take a beating! Full front skidplate—TXT320SD, \$19.95.



### TALK TRUCK!

Send your "4x4" questions and comments to Kevin Hetmanski, [kevinh@airage.com](mailto:kevinh@airage.com).

### SOURCE GUIDE

HITEC RCD (858) 748-6948; [hitecrod.com](http://hitecrod.com).

NEW ERA MODELS (603) 888-4453; [neweramodels.com](http://neweramodels.com).

O.S. ENGINES; distributed by Great Planes Model Distributors (800) 682-8948; [osengines.com](http://osengines.com).

PARMA/PSE (440) 237-8650; [parmapse.com](http://parmapse.com).

PRO-LINE (909) 849-9781; [pro-lineracing.com](http://pro-lineracing.com).

ROBINSON RACING PRODUCTS (209) 966-2465; [robinsonracing.com](http://robinsonracing.com).

TEAM ASSOCIATED (714) 850-9342; [teamassociated.com](http://teamassociated.com).

THUNDER TECH RACING (815) 467-0621; [thundertechracing.com](http://thundertechracing.com).

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The new Lite Machines Corona™ electric helicopter is the ultimate park flyer. With its powerful Electro-Fusion™ 540-size motor, the Corona has punchy performance to fly in confined areas and accelerate against gusty winds. The Corona has patented flexible rotor blades that fold up to reduce crash damage, and flies up to seven minutes on a standard six or seven cell R/C car battery.

Never flown a helicopter before? Don't worry, the Corona comes with a fully illustrated construction manual and an operator's guide that will teach you how to fly on your own. Kits start at \$199. Discount combos contain everything from motors to radio control systems. See your local dealer or call Lite Machines for details.



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## 4 bolt-ons to improve engine performance

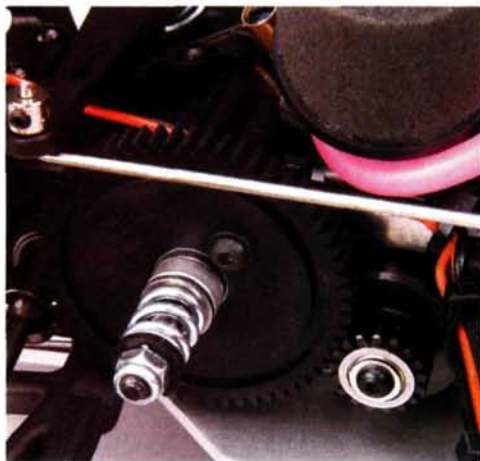
**R**acers and bashers are always looking for ways to get more power from their engines for the least expense. Although the saying "Speed costs" is accurate to some degree, there are a few options to get extra power and performance out of your RC car without breaking the bank. This article details affordable "bolt-on"-style modifications rather than more expensive internal porting and induction mods. When dealing with 2-stroke RC engines, a single modification can make a significant difference; make several modifications, and you won't believe the overall difference.

**1 CHANGE YOUR VEHICLE'S GEARING.** Nitro enthusiasts rarely consider simple gear swaps to alter performance. It's easy to get caught up in a discussion of tuning issues and parts for nitro engines, but altering gearing is by far the cheapest bolt-on mod. Nitro engines have pronounced power bands, and mating your vehicle's gearing with your engine's power band can produce surprising results. For high-revving engines, you can drop a tooth or two on the clutch bell or go up a few teeth on the spur gear to bring the "meaty" part of your engine's power band into the equation. Do the opposite for engines with lots of low-end grunt; go up a tooth or two on the clutch bell, or drop down on the spur gear to get plenty of acceleration and still attain high top speeds.

It's equally important to consider what you plan to do with your vehicle when you alter its gearing. If you're not worried about low-end punch but are looking to drag race with a friend across a large parking lot, you'll get the most bang for your buck by going up several teeth on the clutch bell or going down a few teeth on the spur gear; you'll see a marked increase in top speed if you don't mind sacrificing some off-the-line acceleration. Undergeared engines reach maximum rpm quickly; just keep in mind that you might break a connecting rod or a crankshaft when an undergeared engine is spun at maximum rpm for an extended time. Altering your gearing can solve those problems.

Similarly, if you want to race on a short track with tight curves and do not need excessive top speed, you can drop down a tooth or two on the clutch bell for more low-end punch. To check out how various gear combinations affect your vehicle's drive-train ratio, check out our online

gearing calculator at [radiocontrolzone.com/cars/calculator/asp](http://radiocontrolzone.com/cars/calculator/asp).

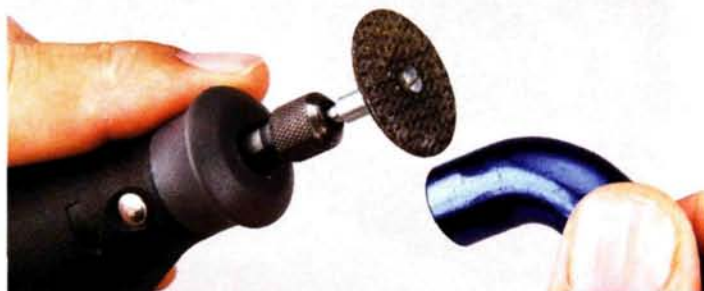


**Left:** it's very easy to change gears on some cars; on this Mugen MST-1, just remove the two spur screws, and the gear comes right off for replacement. While the gear is out, swap out the clutch bell as well.

**Right:** some nitro sedans are equipped with threaded clutch bells. Changing the gearing is as easy as unscrewing the old gear and screwing on a new one.



**2 INSTALL A TUNED PIPE, AND TUNE THE HEADER.** Yet another affordable, highly effective bolt-on modification is a tuned pipe. Ready-to-run vehicles and most box-stock nitro vehicles include either a cast expansion muffler or a very basic exhaust pipe. Though these exhaust systems do reduce engine noise by stifling the production of exhaust gases, they rarely do anything to increase an engine's power. Tuned pipes are engineered to work in concert with a 2-stroke engine's power band and to allow the engine to make power more efficiently. Tuned pipes are available for nearly every RC model; check your vehicle's option parts list, or check out aftermarket tuned-pipe manufacturers such as Trinity, Novarossi, O.S. Engines and MIP for models to fit your particular vehicle and engine combination.



**Above:** the easiest way to shorten your header is with a Dremel tool and a cutoff wheel. Remove only about 1/8 inch of material at a time, and then drive your car. Continue to trim the header until performance improvements plateau. **Below:** the pipe setups shown here are aftermarket upgrades. The pretuned Trinity pipe and header setup can be bolted right on. The O.S. pipe is a good replacement for factory expansion pipes; it allows you to tune your exhaust with a header.



Altering the length of your engine's exhaust header/manifold can also increase performance. Alter the distance between the header and pipe by pushing them closer together inside the coupler. Longer headers make good bottom-end power, while shorter headers produce better top-end power. If the header and pipe touch when you shorten the distance between them, cut 1/8 inch off the header using a rotary tool. Time your vehicle's performance with a stopwatch over a measured distance, and run the vehicle between each cut. Stop cutting the manifold when the engine performance has stopped improving or when you're happy with its performance.



## 3 INSTALL AN ADJUSTABLE PERFORMANCE CLUTCH.

Racers in every racing class agree that your vehicle's clutch drastically affects overall vehicle performance. Clutches harness the engine's power and transfer it to the drive train, so no matter how powerful your engine is, it will still feel soft without a performance clutch. Bolting on an aftermarket clutch is simple, and tuning it for maximum performance is equally easy.

Tenth-scale nitro touring cars and stadium trucks typically come packaged with a durable but conservative clutch system. MIP's circular "4-in-1" clutch and OFNA's 3-shoe clutch are both offered for most 1/10 vehicles, and both types may be tuned for maximum performance with a few simple steps. Eighth-scale buggies and trucks are also supported with aftermarket performance clutches; Fioroni's sliding clutch system, MIP's circular performance clutch and Trinity's K-Factor performance clutch all increase overall buggy performance.

Tuning a new clutch is as important as buying one in the first place. With the new clutch installed, mark a distance of approximately 50 to 75 feet, and test your acceleration there. From a standing start, nail the gas. For rapid off-the-line acceleration, tune the clutch shoes for a slightly higher rpm stall. Tuning the clutch shoes is as simple as cutting 1/8 inch of shoe material off the trailing edge of each one. Run the car after each clutch "tune," and continue to cut 1/8 inch off the shoes until acceleration has stopped improving. Removing too much material can cause the shoes to wear prematurely, however, so stop cutting as soon as you're happy with the acceleration.

## 4 BOLT ON A LARGER COOLING HEAD.

High operating temperatures drain horsepower, and to a certain extent, the cooler you can get your engine to run, the more power you can make.

Several aftermarket manufacturers offer larger, more efficient cooling heads than the stock ones included with your engine. Dynamite, O'Donnell/DuraTrax and MSJ all offer excellent bolt-on cooling heads that can significantly reduce your engine's running temperatures.

As long as the cooling head is designed properly and has the correct head-button clearance for your engine, an aftermarket head can allow you to tune your engine slightly leaner to extract more power at lower temperatures. Installing a larger cooling head does not allow you to run the engine at excessively lean needle settings, however.



Aftermarket heads can help reduce an engine's running temperature, especially on engines with cast heads. Replace the cast head with an aluminum head, and you'll notice a significant temperature decrease.

you tune an engine with a stock head: tune the engine for best performance, and check its head temperature. Chances are that with a slightly leaner needle setting, your engine will run slightly stronger at the same or lower operating temperature than it did before the cooling-head swap.



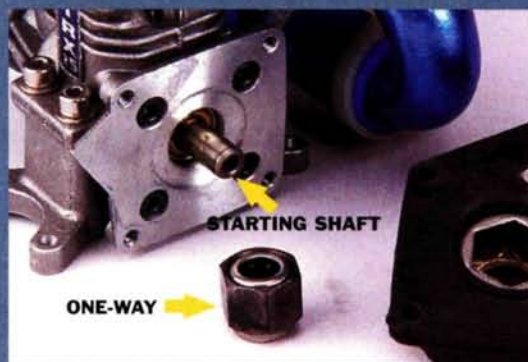
A Centax clutch such as this one from Trinity allows you to adjust the clutch's engagement for better off-the-line response.

I keep having trouble with my T-Maxx; it has a stock TRX .15 with a pull-starter. Every time I try to start it, the one-way bearing slips. I have replaced the bearing several times, and it works well for a while. But if I take the pull-starter and one-way bearing off, clean them and reinstall them, the engine starts easily until it runs out of gas. After I've refilled the tank, I have a hard time starting it. I have been told by my hobby shop that if I drill a small hole in the back of the pull-starter case, that will solve the problem. What do you think?

Willie Selman [email]

Willie, when the bearing is worn and covered with moisture, fuel residue, or castor oil from the exhaust, it will slip. I spoke with the people at Traxxas about this, and to fix it, they recommend that you replace both the one-way bearing and the starter shaft. As you've discovered, replacing only the one-way bearing will not solve the problem because the starter shaft wears as the bearing wears. The starter shaft spins with the crankshaft at the actual engine rpm, so in effect, any contamination inside the starter housing will "polish" the shaft until it's out of round. Your TRX .15's one-way starter bearing will have a long life if you replace the starter shaft when you replace the bearing.

Excess oil and castor build-up can also cause the bearing to slip on the shaft, even when both parts are new. To clean the one-way bearing and starter shaft, you must remove the starter housing entirely. Do not drill holes in the starter housing, as the holes will introduce a far too accessible path for bearing-killing contamination. Traxxas recommends that a one-way bearing be cleaned with motor spray and that you run a paper towel through the center of the bearing to completely remove contaminants. Wipe the starter shaft with the paper towel and place a drop of Marvel Mystery Oil (or another lubricant) on the bearing. The one-way bearing must be oiled, or it will wear prematurely; a light oiling is fine—don't saturate it. If you find yourself cleaning the bearing and shaft regularly, and you have replaced the bearing and the shaft recently, examine the engine's tuning and piston/sleeve fit. An overly rich high-speed needle setting or a worn-out piston and sleeve can cause excess fuel and oil to blow by the backplate and cause one-way bearing slippage.



If you suspect that your one-way bearing is slipping and needs to be replaced, you should replace both it and the starting shaft.

## SOURCE GUIDE

**DURATRAX/O'DONNELL**; distributed by Great Planes; duratrax.com.

**DYNAMITE**; distributed by Horizon Hobby (800) 338-4639; horizonhobby.com.

**FIORONI**; distributed by General Silicones Co. USA (626) 338-3815; generalsilicones.com.

**GREAT PLANES MODEL DISTRIBUTORS** (800) 637-7660; greatplanes.com.

**MIP** (626) 339-9007; miponline.com.

**MSJ PRECISION PRODUCTS** (480) 632-5337; msjproducts.com.

**MUGEN USA** (949) 707-5607; mugenracing.com.

**NOVAROSSO**; novarossi.com.

**OFNA RACING** (949) 586-2910; ofna.com.

**O.S.**; distributed by Great Planes; osengines.com.

**TRAXXAS CORP.** (888) 872-9972; traxxas.com.

**TRINITY PRODUCTS INC.** (732) 635-1600; teamtrinity.com.

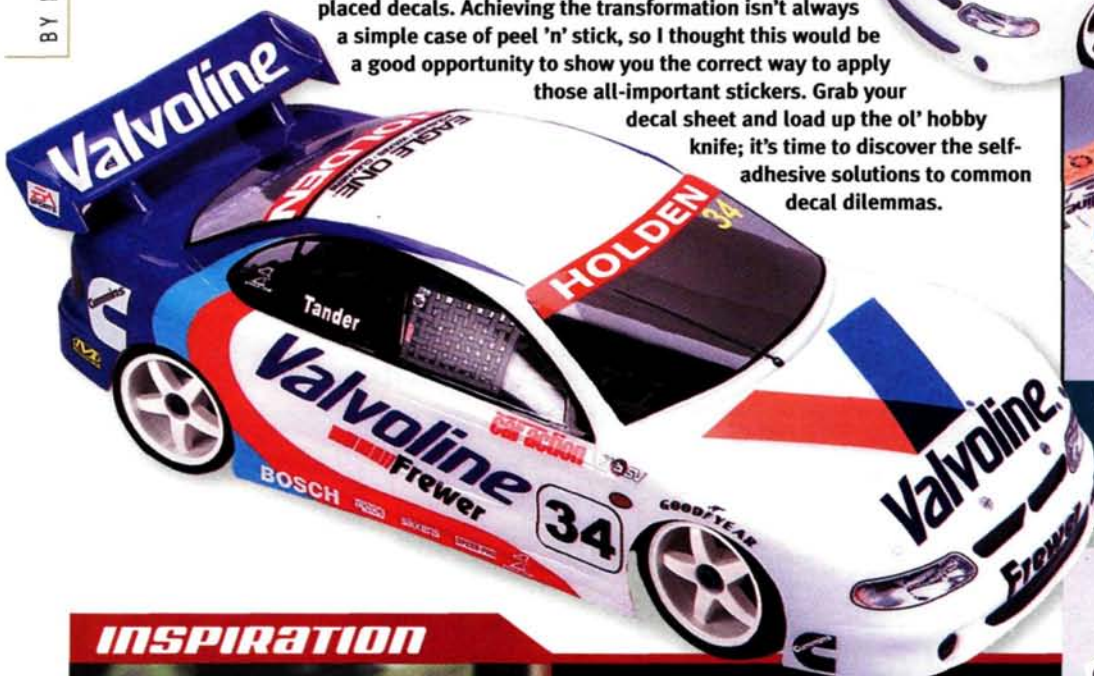
## CONTACT THE PISTON POWER SOURCE

Send your "Piston Power" questions and comments to Stephen Bess, [stephenb@airage.com](mailto:stephenb@airage.com).



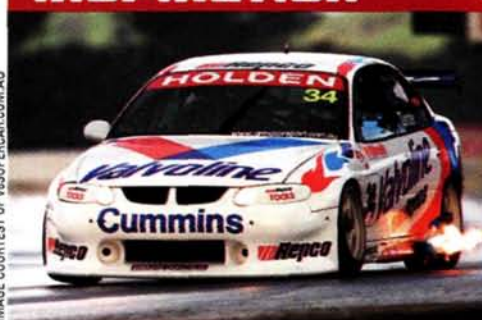
## No more sticker shock!

One of my favorite things about painting bodies has nothing at all to do with paint; it's seeing a body go from boring to bitchin', simply by adding a few well-placed decals. Achieving the transformation isn't always a simple case of peel 'n' stick, so I thought this would be a good opportunity to show you the correct way to apply those all-important stickers. Grab your decal sheet and load up the ol' hobby knife; it's time to discover the self-adhesive solutions to common decal dilemmas.



A simple, 2-color paint job, the included stickers and a few well-placed decals add up to a killer body. When it comes to race cars, don't skimp on the "vinyl horsepower."

### INSPIRATION



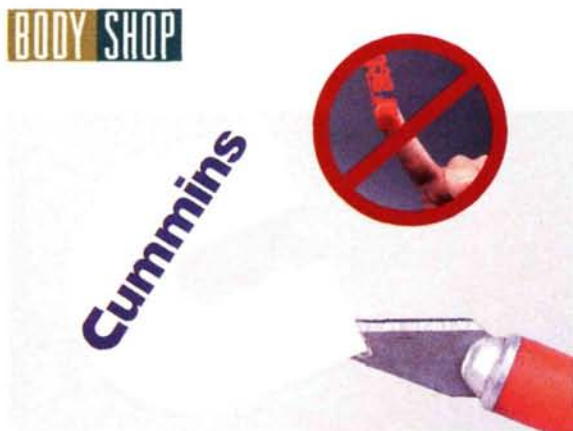
This month's body was inspired by too many late nights watching the Speed Channel. I combined Frewer's newly imported Holden Commodore, some vintage Mark Martin Slixs decals and a few scraps of vinyl trim to create a replica of Garth Tander's no. 34 Valvoline racer. The difference that a few stickers can make is amazing!



**WINDOW MASKING.** Nothing gets a body off to a bad start like botched window masking. The low-tack vinyl that's included with most bodies works well, but it's easy to deform if you try to reposition it after it has been laid down. Lift the masking from the carrier sheet and aim for a corner adjacent to the window's longest side. Set the corner down, align the flat edge of the vinyl with the window and gently lay the mask in place; don't sweat it if there are bubbles in the interior sections of the window mask. When the decal is in place, burnish (rub down) the edges with your finger to ensure that no paint bleeds underneath.

**TRIMMING DECALS.** You can cut decals out with scissors, but since you're cutting the backing along with the decal, the sheet will soon become a tattered mess. The best (and neatest) way to cut decals is with a hobby knife; it takes a little practice to get the right touch, but you'll need only light pressure and a sharp blade to cut through the material without going through the backing. To make long, straight cuts, hold the knife toward the end of its handle and draw the blade toward you with your whole arm instead of with just your wrist. Don't try to cut compound curves or intricate shapes in one continuous pass; instead, lift the blade and reposition the decal sheet so you're always working at a comfortable angle.





**APPLYING DECALS.** Never use your fingers to transfer a decal from the backing sheet onto the body; nothing screams “hack” more than visible fingerprints under the graphics. Use your hobby knife to lift the decal off the backing sheet and then transfer it to the body using the blade of the knife.

For larger graphics, cut out the decal with scissors so you can use its backing as a “handle.” Fold back only a small portion of the backing to reveal the adhesive. Align the graphic, “tack” it into place, and then bend the backing away as you smooth down the rest of the decal.

When you apply oversize graphics that cover the entire hood or side of the body, it’s best to first wet the body with a soapy solution. Mix a teaspoon of dishwashing soap with clean water in a spray bottle. Spritz the body with the solution, and slide the decal into place. The soapy water allows you to easily reposition the decal until it’s perfectly aligned. When you’ve got the graphic just where you want it, squeegee out the excess soap solution with your finger and let the body dry.



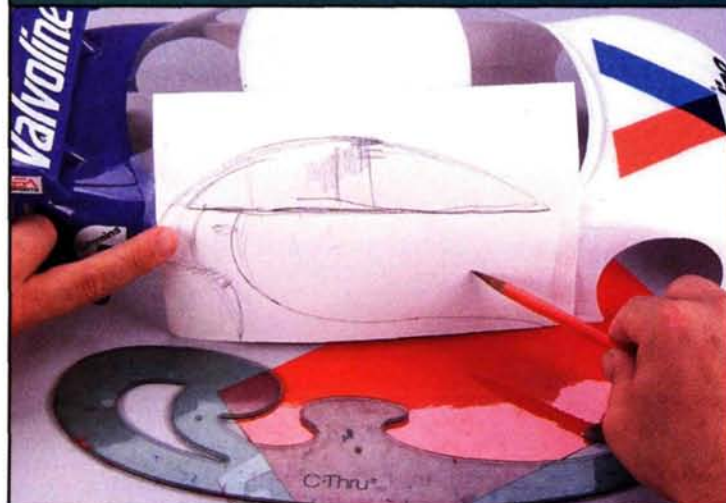
**WRINKLE REGIMEN.** When flat decals are applied over curved surfaces, wrinkles are inevitable. Decals made of stretchy vinyl can conform to curves without wrinkling, but cellophane-like decals are not so forgiving. To avoid wrinkling, gently warm the decal with a hair dryer as you apply it. Do not overheat the decal, as it may melt and make you very unhappy. For truly impossible wrinkles, make a small slit in the wrinkle’s crease, gently lift the edges and smooth them down so they overlap.

**BUBBLE BURSTING.** No matter how careful you are, air bubbles can become trapped beneath decals—especially larger ones. First, try to work the bubble to the edge of the decal by applying pressure directly behind the bubble and pushing it toward the nearest edge. If all else fails, make a small slit in the bubble to allow the trapped air to escape as you push the bubble flat.

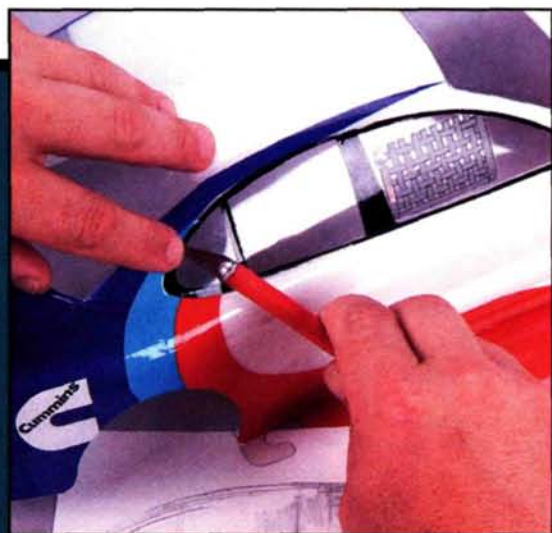


## TRICK TRIM

Here’s a fast way to add color to those bland bodies. Make a paper template of the area that needs some sprucing up.



Transfer the design onto some self-adhesive trim sheet (available at most hobby shops), then cut the design out and apply it like any decal. After the graphic has been applied to the body, people will swear that it was painted—unless they inspect it really closely!





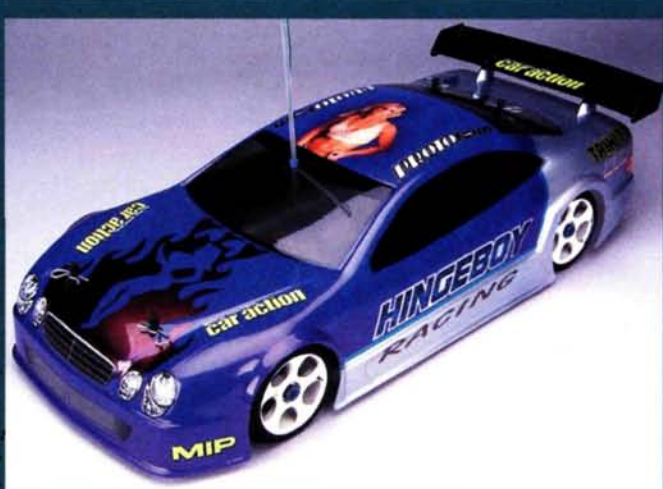
## New in the Shop

### FREWER Bodies

Fans of the Australian V8 Super Touring class no doubt recognized this month's decal model as a Holden Commodore. It's from Australian body maker Frewer, imported by Schumacher USA. All the Frewer shells are nicely detailed and include full-color decals, vinyl window masks and overspray film. If your shop doesn't have them, order directly from Schumacher at [racing-cars.com](http://racing-cars.com).



NAME	WIDTH (MM)	PART NO.	PRICE
Laguna	200	FR11NW	\$19.99
BMW Z3	190	FR12N	\$19.99
Honda Integra	190	FR13N	\$19.99
Audi A4	195	FR14N	\$19.99
Accord	190	FR16N	\$19.99
Mercedes SLK	190	FR18N	\$19.99
Porsche 993	192	FR1N	\$19.99
Volvo S40	190	FR20N	\$19.99
Commodore VT	190/200	FR21N/FR21NW	\$19.99
Subaru 2002 Spec	200	FR22NW	\$19.99
Evo 6	200	FR23NW	\$19.99
Falcon	195	FR24N	\$19.99
Porsche GT1	200	FR25NW	\$19.99
Porsche 911 GT1	235	FR25W	\$21.99
BMW 3 Series	200	FR26N	\$19.99
Jaguar XJR6	235	FR26W	\$21.99
F155 Truck	200	FR27NW	\$19.99
Viper GT	200	FR28NW	\$19.99
Stratus	195/200	FR29N/FR29NW	\$19.99
VDS Lola	200	FR30NW	\$21.99
Silvia	190	FR3N	\$19.99
Mercedes C180	190	FR4N	\$19.99
BMW 320i	190	FR5N	\$19.99
Honda Civic	193	FR6N	\$19.99
Toyota Supra	190	FR7N	\$19.99
Opel Vectra	235	FR7W	\$21.99
Mazda RX7	185	FR9N	\$19.99



### FRESH PAINT

Kevin Hetmanski, Down the Hall, CT  
Contrary to popular belief, Kevin "4x4" Hetmanski does drive RC vehicles other than monster trucks, and yes; he lays down some nice paintwork. This is his personal Team Associated TC3 outfitted with a Protoform Mercedes CLK DTM. Apparently, Hingeboy has been raiding my paint racks again; his CLK features Faskolor silver, blue, purple and teal with Alclad 2 chrome accents on the lettering. A XXX-Main flame mask kit and Picture Glue were used to create the body's fiery look and to paste Britney's mug under the paint. Kevin airbrushed the flames using Spaz-Stix red/orange/purple prismatic paint.

Do you have a sharp, uncluttered photo of your best paintwork? Send it in! Explain the types of paint, products and techniques you used to finish it. Be sure to include your full name and address and your email address if you're online. For information about sending electronic images, check out [www.caraction.com](http://www.caraction.com). Send print or slide photographs to "Body Shop," RC Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA.



Frewer's new 2002 Spec Subaru WRC body.



### SPAZ-STIX Prismatic and glow-in-the-dark paints

Give your RC body a custom show-car look with one of the eight new shades of color-change lacquers from Spaz-Stix. Depending on which paint you airbrush and which angle you view it from, the color shifts from among two to four colors. For nighttime running, Spaz-Stix has nine different glow-in-the-dark colors, too! The paints have a strong odor, so use them in a well-ventilated area; the results are well worth the extra trouble. The Prismatic shades sell for \$9.99 for a 1-ounce bottle, and the glow colors cost \$4.99.

#### PRISMATIC COLORS

- Blue/Purple/Red—SW1000
- Red/Orange/Purple—SW1010
- Orange/Purple/Teal—SW1020
- Gold 'N' Red—SW1030
- Gold 'N' Green—SW1040
- Gold/Green/Orange/Purple—SW1050
- Gold/Orange/Purple/Red—SW1060
- Green/Purple/Teal—SW1070

#### GLOW IN THE DARK

- Green—XG500
- Yellow/Green—XG525
- Blue—XG550
- Blue/Green—XG600
- Light Blue—XG625
- Sky Blue—XG650
- Purple—XG700
- Orange—XG750
- Red—XG800

### CONTACT THE BODY SHOP

Send your "Body Shop" questions and comments to Bob Hastings, [bobh@airage.com](mailto:bobh@airage.com).

#### SOURCE GUIDE

FREWER: distributed by Schumacher USA (813) 889-9691; [racing-cars.com](http://racing-cars.com).  
SPAZ-STIX: distributed by HRP Distributing Inc. (801) 978-9500.  
SLIXX (714) 891-4212; [slixx.com](http://slixx.com).



## Trinity Battery Cooler/Car Stand

**THE HEART OF TRINITY'S NEW BATTERY COOLER CAR STAND** is a 12V DC fan that blows cooling air up through the stand's foam base (you hook up the fan to a power supply or to a 6- or 7-cell pack). Though small enough to fit into any pit box, the stand is large enough to support a 1/10-scale car and allows you to use the fan to cool the car's motor (and its batteries while they're still in the car, if the chassis is slotted). When you aren't parking your car on the foam, you can use the stand to cool one or two battery packs. The foam is slotted for a pair of 6-cell packs assembled in a side-by-side configuration, but you can also place stick packs over the slots for cooling.

In tests, the fan-stand cooled down hot, fresh-from-the-track cells to ambient temperature in about 15 minutes. The only things not to like are the fan's short power leads, which require the addition of an extension unless you place the fan-stand right next to its power supply.

Trinity Battery Cooler/Car Stand—  
item no. RC5112; \$15.99.

Trinity Products Inc. (732) 635-1600; teamtrinity.com.

### FINAL CALL

*You'll need to extend its power leads for maximum convenience, but the fan-stand does work well for car and battery cooling.*



## SpeedMind Battery Heat Sinks

**AS YOU'VE NO DOUBT NOTICED**, battery packs warm up as they're discharged, and they can be downright hot after a 5-minute race (maybe that's why they call them "heats"). Batteries run longer and have more punch when they're kept cool, and that's where SpeedMind's machined-aluminum battery heat sinks come in. The heat sinks simply sit on top of the battery pack to draw away heat and dissipate it through their fins. It's difficult to determine just how much cooling the heat sinks provide, but after a run, ours

were warm right up to the fins' tips, so they definitely drew off some of the heat. If you try a set, be sure to check your chassis for clearance; the heat sinks protrude 4mm from the top of the pack and may not fit under some top decks. Likewise, you may need to add spacers under your car's battery hold-down to accommodate them. The SpeedMind heat sinks are sold in pairs to suit saddle- or side-by-side packs in a choice of three colors.

Battery Heat Sinks—item nos. GW035P (purple), GW035B (blue), GW035BK (black); \$15/pair.

SpeedMind; distributed by Magma Intl.  
(905) 886-1808; speedmind.ca.



### FINAL CALL

*It's hard to say how much cooling they provide, but SpeedMind's heat sinks look good and fit well.*



# White Racing Rustler Graphite Chassis Kit

**WHITE RACING'S CHASSIS KIT** includes everything you'll need to replace the Rustler's stock plastic chassis with a double-deck graphite version; there's a pair of graphite chassis plates, Associated battery cups and antenna mount, RPM servo mounts, steering-bellcrank standoffs and all the hardware required to mount the parts.

The square-edged chassis plates aren't fancy, but the  $\frac{3}{32}$ -inch graphite plate is high-quality stuff. Installation took about a half hour, and the White-equipped Rustler gained a noticeable amount of stiffness, but the way the parts go together is a little wonky. The hardware included to retrofit the Rustler's steering bellcranks is very Home Depot; pan-head screws pass through the lower chassis and are capped by steel nuts, with fender washers in between. The pan-heads project from the chassis' underside, and the countersunk holes for the kit's flathead hardware weren't quite deep enough to deliver a completely smooth chassis bottom. The top-deck fit is a little weird, too; the upper deck rises from the nose bulkhead and steering bellcranks to meet the rear shock tower "shelf," which is 14mm higher than the tops of the nose bulkhead and bellcrank standoffs. The top-deck design also interferes with battery placement. Three positions are available for holding the pack across the chassis, but if you want to use the down-the-middle option (as used by the stock Rustler chassis), you'll have to remove the upper-chassis deck to make pack changes. Arguably, the stiffness gained and the tuning flexibility of moving the battery pack fore and aft on the chassis outweigh the bummer of losing the in-line position, but it is something to consider before you buy.

White Racing Rustler Graphite Chassis Kit—\$70.

White Racing; [white-racing.com](http://white-racing.com).



## FINAL CALL

*White Racing's chassis kit will lighten and stiffen your Rustler, but the hardware is a bit rough, and the battery placement is definitely old school.*



## Pro-Line Mounted Maxx Tires

**PRO-LINE'S POPULAR MAXX MASHER AND MAXX ROAD RAGE TIRES** are now available mounted on chrome-plated, 1/2-inch-offset Velocity 6 wheels. Firm foam inserts prevent the treads from deforming during hard cornering, and the tires are bonded to the rims with Pro-Line Premium Blend Team CA glue. The glue crew did a good job; the beads are fully set, and there isn't any visible CA on the tires' sidewalls. Most important, the tires stayed stuck to the rims! They also did a good job of staying stuck to the track, particularly when we hit the pavement with the Road Rage versions.

The Maxx Mashers are better suited to backyard and all-around off-road action. Both sets of sneakers add extra rollover resistance to any Maxx excursion, thanks to the additional offset of the Velocity 6 wheels, which widen the Maxx truck's stance by 1 inch. The tires are sold in pairs and include Pro-Line decals.

Maxx Masher tires—item no. 1075-10; \$45/pair.

Maxx Road Rage tires—1082-10; \$45/pair.

Pro-Line (909) 849-9781; [pro-lineracing.com](http://pro-lineracing.com).



### FINAL CALL

*Why glue your own when you can buy genuine Pro-Line tires, CA and Velocity 6 wheels, all perfectly assembled by the factory?*

## OFNA 9-Piece Metric Tool Set

**THIS TOOL SET** includes four hex bits (1.5, 2.0, 2.5 and 3mm), three socket bits (4.5, 5.5 and 7mm) and two screwdriver bits (no. 2 flat-head and no. 2 Phillips)—basically, everything you need to start wrenching on your car. The bits have 1/4-inch shanks that fit into the aluminum handle, which has a soft rubber grip. All the bits fit well, and the assembled tool feels solid. The bits can also be used in a powered screwdriver— not recommended for kit assembly because it's too easy to strip screw holes in plastic, but it does speed disassembly when it's time to rebuild your car. ■

9-piece metric tool set—item no. 10823; \$39.95.

OFNA Racing (949) 586-2910; [ofna.com](http://ofna.com).



### FINAL CALL

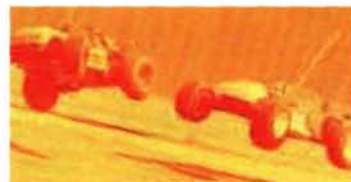
*OFNA's 9-piece versatile, compact tool kit is especially useful when you want to travel light.*



# PRO-LINE

## YOUR 2002 TRACK GUIDE

# DIRECTORY



**FREE! Track owners!** You can be included in this directory brought to you by Pro-Line. Just fill out the coupon on page 261. Additional track listings may be found online at [www.rccaraction.com/info/track\\_directory\\_form.asp](http://www.rccaraction.com/info/track_directory_form.asp).

### ALABAMA

**Hobby Raceway**, Tusculoo, Alabama 35405; Mark or Don Holt, 205-759-4517/205-333-8679; email: makkholt@aol.com



**Mobile Miniature Speedway**, Theodore, Alabama 36582; Richard Sweetser, 251-653-6643; email: jbogard@comcast.net; web: mywebpages.comcast.net/jbogard



**North Cullman Raceway**, Cullman, Alabama 35055; Daniel Lories, 256-775-2491; email: cullmanrchoobbies@yahoo.com; web: www.cullmanrchoobbies.homestead.com



**Oak Mtn R/C Raceway**, Columbiana, Alabama 35051; Matthew Gordon, (205)669-6837; email: oakmtnraceway@hotmail.com



**R/C Hi-Tech Raceway**, Huntsville, Alabama 35811; Rick Chambers, 256-539-1347



**Spring Cove International Speedway**, Florence, Alabama, 256-757-1562; email: rvines@hiway.net; web: www.springcovespeedway.com/SpringCove.htm



### ARIZONA

**HobbyTown Raceway**, Tucson, Arizona 85713; Jay, (520) 882-8888; web: www.hobbytown.com



**HobbyTown U.S.A.**, Phoenix, Arizona 85044; Doug McFarland, (480) 598-5282



**R/C Sports Mania**, Phoenix, Arizona 85017; Gary Dick, (602) 278-3671



**Scottsdale R/C Raceway**, Scottsdale, Arizona 85251; Scott Anfinson, 480-945-2186

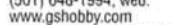


### ARKANSAS

**Alison Offroad RC Raceway**, Little Rock, Arkansas 72206; Steve Alison, (501) 490-1227; email: jason@alisonoffroad.com; web: www.alisonoffroad.com



**Grand Slam Hobby**, Ft. Smith, Arkansas 72901; Bryon Shumate, (501) 648-1994; web: www.gshobby.com

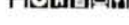


**Sparks R.C. Raceway**, Paragould, Arkansas 72450; Tommy Sparks, (870) 239-3606



### CALIFORNIA

**Capital City R/C**, Sacramento, California 95829; Homer, 916-383-3445; email: lanno@pacbell.net; web: www.capitalcityrc.com



**Castle Hobbies**, San Jose, California 95124, (408) 377-3771



**CCRCCC**, California City, California 93505; Josh Geiger, (760)373-2537; email: gorange@ccis.com



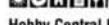
**Crystal Park Raceway**, Compton, California 90202-4925; James Reese, 310-631-0307; email: info@crystalparkraceway.com



**Delta R/C Raceway & Hobbyshop**, Antioch, California 94509; Rick or Steve, (925) 778-2965; web: www.deltarc.com



**Extreme RPM Hobbies**, Grand Terrace, California 92313; Bobby Haney, 909-370-3379; email: Extremerpmracing@aol.com; web: www.ExtremeRpmRacing.com



**Hobby Central Raceway**, Poway, California 92064; Lee, (858) 513-0373; web: www.hobby101.com



**Hobby World**, San Jose, California 95129; Guy Bassett, (408) 873-2109



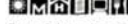
**Hot Rod Hobbies**, Saugus, California 91350; Jimmy Babcock, (661) 255-2404



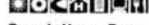
**Jake's Performance Hobbies**, Rohnert Park, California 94928; Jake, (707) 586-3375; email: JPHRacing001@aol.com



**Paradise Hobbies**, Paradise, California 95969; David Lafabregue, (530) 877-6447; email: paradisehobbies@aol.com



**Pure Adrenaline RC & Hobby**, Sonoma, California 95370; Matt, (209) 536-6232; email: contact@pahobby.com; web: www.pahobby.com



**Racer's Haven Raceway**, Bakersfield, California 93309; Greg Cooper, 661-835-0441; web: www.racers-haven.com



**Rescue Mini R/C Speedway**, Rescue, California 95672; Bruce Pease, (530) 621-3948; web: www.innercite.com/~rccracing/



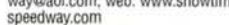
**Ripon R/C Speedway**, Ripon, California 95366; Dan Tanis, (209) 599-5160



**Sacramento RC Racing & Hobbies**, Sacramento, California 95824; Andreas Muller, (916) 424-4001; email: andreas123@earthlink.net; web: www.77sunset.com



**Showtime R/C Speedway**, Bakersfield, California 93301; Don Risner, 661-328-1481; email: showtimespeedway@aol.com; web: www.showtime-speedway.com



**So Cal R/C Raceway**, Huntington Beach, California 92646; Jim or Lana, 714-963-7484; email: info@socialrc.com; web: www.socialrc.com



**SpeedWorld Raceway**, Roseville, California 95678; Billy Bowerman, 916-783-8864; email: speeddog@mindsync.com; web: speedworldraceway.com



**The Dirt Valley R/C Racepark**, Hemet, California 92544; Joe Christenson, (909) 925-7592



**Ventura RoadRunners**, Camarillo, California 93010; Big Al, 805-564-4144; email: dubebigal@aol.com; web: www.venturaroadracers.com



### COLORADO

**MHOR R/C Raceway**, Aurora, Colorado 80011; Jess A. Brockman, (303)343-0151; email: questions@mhorr.com; web: www.mhorr.com



**Valley West Off-Road RC Club**, Grand Junction, Colorado 81504; Jodie Grein, 970-242-1412; email: geerhed@gj.net; web: www.gj.net/~geerhed/vwvrcind.html



### CONNECTICUT

**K&N R/C Speedway Inc.**, Stafford Springs, Connecticut 06076; Jim or Bill, (860) 684-9896



**Manchester Hobbies**, Manchester, Connecticut 06040; Jim or Mike Tierni, (860) 643-4768



**R/C Madness**, Enfield, Connecticut 06082; Christopher Marcy, (860) 741-6501; email: cmarcy@rcmadness.com; web: www.rcmadness.com



**Xtreme Radio Control**, New Milford, Connecticut 06776; Paul or Pete, (860) 354-4703



### DELAWARE

**ESRC**, Seaford, Delaware 19973; Bill Auchterlone, 302-734-2757/302-629-3944; email: aeromarine@erols.com



### FLORIDA

**B&T RC Central**, Fort Walton Beach, Florida 32547; Mike or Tim, 850-863-1666



**Daytona R/C Racing Assoc.**, Ormond Bch., Florida 32174; Bill Flaherty, 386-676-9001; email: bj@bestnetpc.com; web: daytona-rc.homeip.net



**Farmers Hobby Shop & Raceway**, Tampa, Florida 33619; Greg Cardone, 813-248-3314; web: www.farmershobby.com



**First Coast Speedway**, Jacksonville, Florida 32211; Bobby Phillips, 904-716-0861; web: www.firstcoastautoracing.com



**G&C Hobby Raceway**, Lantana, Florida 33462; George, 561-547-3812; email: gnhobbies2@cs.com; web: www.gnhobbies.com



**GBs Hobbies**, Port St. Lucie, Florida 34952; Track Owner, 561-460-2844; email: qaircrt@bellsouth.net



**Grand Prix RC-Club**, Ft. Pierce, Florida 34945; Luther Peterson, 772-473-2130; email: LWPSPEED@aol.com



**Gulf Coast RC Car Club**, Naples, Florida 34105; Mark Benfield, 941-774-7116; email: teamnfe@aol.com



**Hobby Central**, Pensacola, Florida 32504; Bill McLester, 850-471-9800; email: trackinfo@hobbycentralrc.com; web: www.hobbycentralrc.com



**Hobby World Raceway**, Jacksonville, Florida 32210; Greg, (904) 772-9022



**Kissimmee R/C Auto Racing**, Kissimmee, Florida 34741; John Rosser, (407) 944-4913; email: john@craftworldflorida.com; web: www.craftworldflorida.com



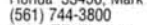
**Monster Hobbies**, Deerfield Beach, Florida 33441, (954) 428-9118



**Monza R/C Speedway**, Miami, Florida; Ed Delgado, (305) 437-9895



**Morris Kohl's Raceway and Hobby Shop**, Tampa, Florida 33604; Morris Kohl, (813) 931-1626



**My Rose Hobbies & Crafts**, Jupiter, Florida 33458; Mark Watson, (561) 744-3800



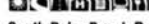
**NORRA**, Naples, Florida 34104; Rob Dondorfer, 239-417-1099; web: www.norra.mainpage.net



**Pro Hobbies Speedway**, Apopka, Florida 32712; Jim, (407) 886-4615; email: prohobby@juno.com



**Sarasota RC Speedway**, University Park, Florida 34201; Jim Wilson, (941) 358-7047



**South Palm Beach Racers**, Boca Raton, Florida 33486; Mike Fazio, 561-338-5367; email: epine01@bellsouth.net; web: http://communitylink.gopbi.com/group/sprclub



**Superior Hobbie R/C Parking Lot Racing**, Casselberry, Florida 32707, (407) 834-9299; email: racing@superiorhobbies.com; web: www.superiorhobbies.com



**SWF RC Car Club**, Fort Myers, Florida 33907; Mike Nordone, 941-278-1295; email: swfrcrcarclub@yahoo.com; web: swfrcrcarclub.tripod.com/swfrcrcarclub



**Tallahassee R/C Speedway**, Tallahassee, Florida 32301; Roland Costine, 850-671-2814; email: idothtre@hotmail.com; web: www.geocities.com/rcdude1/rccars.htm



**Tampa R/C Raceway**, Seffner, Florida 33584; Carole Raimondi, 813-655-6366; email: carolehobbytown@aol.com



**West Coast R/C Club**, Lutz, Florida 33549; J.R. Sanyet, President, 813-991-0168

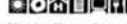


### GEORGIA

**Augusta R/C Racer's Club**, Augusta, Georgia 30909; Darren, 706-860-5608



**Dalton Motorsports**, Dalton, Georgia 30721; Keith Manton, 706-226-6699; email: dms@dalotene.net



**Hobby Town Raceway**, Columbus, Georgia 31909; Frank Bastos, (706) 660-1793; email: fbastos@mindspring.com; web: www.hobbytown.com



**Primetime Raceway**, Calhoun, Georgia 30701; Tommy Jackson, 706-625-9037; email: primetimehobby@gccinternet.net; web: primetimehobby@gccinternet.net



### KEY TO SYMBOLS

	Indoor		Concrete
	Outdoor		Asphalt
	Off-road		Minis & Micros
	On-road		On-site hobby shop
	Oval		AC power
	Dirt oval		Auto lap counting
	Carpet		Food available



**SCORE-Phil Hurd Raceway**, Pooler, Georgia 31322; Joe Ellis, 912-748-1988; email: jphilip@scad.edu; web: www.score-racing.org



**The Flight Box Hobby Shop**, Rome, Georgia 30161-6826; Leslie Duke, (706)-234-3014



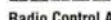
## GUAM

**Guahan Off-Road Racers Mangilao**, Dededo, Guam 96929; Mr. Yoshimura, 671-637-8882; email: thumbtack2@yahoo.com; web: guahanracers.netfirms.com/



## HAWAII

**A.S.I. Racing**, Kapaa Kauai, Hawaii 96746; Arnold Morales, 808-821-8132



**Radio Control Assoc./Alaa Park Raceway**, Pearl City, Hawaii 96782; Ace R/C Products, (808) 456-1279



**Sandy Flemings**, Pearl City, Hawaii 96782; Dave Caldwell, 808-477-9661; email: info@formula1-rc.com; web: www.formula1-rc.com



## IDAHO

**Almota Ranch R.C.s**, Twin Falls, Idaho 83301; Casey Clements, (208) 733-8667; email: james\_casey\_clements@hotmail.com



**Capital Dirtburners**, Boise, Idaho 83702; Joe Thompson, 208-466-6334; email: internarchitect@yahoo.com; web: communities.msn.com/capitaldirtburners



**DM Raceway**, Pocatello, Idaho 83201; Mike Buttafalo, 208-233-8163; email: dmraceway.20m.com; web: www.dmraceway.20m.com



## ILLINOIS

**AJs Raceway & Hobby**, DeKalb, Illinois 60115; AJ, 815-756-2772; web: www.ajsraceway.com



**C.I.R.C.A.**, Jacksonville, Illinois 62650; Sport 'n' Hobby, (217) 245-1375



**N Hers Hobbies Raceway**, Bloomington, Illinois 61701; Kevin Turek, 309-827-0204; email: hisnshobbies@aol.com



**HobbyTown USA**, Oak Park, Illinois 60301; Mark or Fred, (708) 445-8056; email: htuopill@aol.com



**Machesney Park Raceway**, Machesney Park, Illinois 61115; Gina, (815) 282-1311; email: mpr30@aol.com; web: www.mpr30.homestead.com



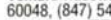
**Monee R/C Raceway**, Monee, Illinois 60449; Roy or Roberta Moody, (708) 534-2422 (track), (708) 799-5597 (office)



**Primetime Hobbies**, Tremont, Illinois 61568; Don Davis, 309-925-9999; email: staff@primetimehobbies.com; web: www.primetimehobbies.com



**Radio-Active Raceway**, Bolingbrook, Illinois 60440; Jim, (630) 759-7557; email: RCvolar@aol.com



**Venture Raceways**, Libertyville, Illinois 60048, (847) 549-6963



## INDIANA

**Bremen Racing Ent.**, Bremen, Indiana 46506; Dale Heuberger, 219-546-3807



**Duneland Hobbies & Raceway**, Portage, Indiana 46368; Ron, 219-763-1610; email: RTrobaugh1@email.msn.com; web: www.dunelandhobbies.com



**Hobby Barn Raceway**, Terre Haute, Indiana 47802-9694, (812) 299-5773



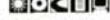
**P&T Hobbies and Raceway**, Mitchell, Indiana 47446; Paul Weber or Tom Logsdon, (812) 849-6666; email: pnhobby@quest.net; web: www.pnhobby.com



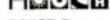
**Pete Russell's R/C Speedway**, Elkhart, Indiana 46516; Pete Russell, 574-293-1827



**R/C World of Indiana**, Lynn, Indiana 47355; Joe Kolp, (765) 874-2464; email: rcworld@rcworld.com; web: www.RCWORLD.com



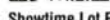
**RC Barn**, Monroe, Indiana 46772; Mark Lengerich, (219) 692-6600; email: bigdaddy@adamsswells.com; web: www.rcbarn.com



**RCRCR Raceway**, Boonville, Indiana 47601; Scott Payton, 812-477-9661; email: spdracer@speedex.net; web: www.rcrcr.com



**Schoolyard RC Speedway**, Lagrange, Indiana 46761; David W. Bryan, 260-463-3558; email: dwbryan@loc.net; web: www.rcspeedway.net



**Showtime Lot Racing**, Fort Wayne, Indiana 46819; Mike Romines, (219) 478-6099; web: fortwaynecr-park.tripod.com/



## IOWA

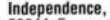
**Ames Radio Control Speed Assoc.**, Ames, Iowa 50014; Ryan Davis/Brad Scandrett, 515-231-3813/515-432-0467; email: Davismotors@aol.com



**Dubuque R/C Speedway**, Dubuque, Iowa 52002; Craig Schmal, 563-587-0218; email: rcraig7@aol.com; web: www.geocities.com/dbqrc



**Hobby Haven**, Des Moines, Iowa 50322; Rick Marble, (515) 276-8785; web: www.hobbyhaven.com



**Independence**, Independence, Iowa 50644; Eugene Bachman, 319-266-3857; email: BachmanE2@hotmail.com



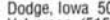
**Iowa City R/C Racing Association**, Iowa City, Iowa 52240; Hobby Corner, (319) 338-1788



**IROAR-Vinton Raceway @ Vinton Roller Rink**, Cedar Rapids, Iowa 52402; Ed Karr, 319-362-1291; email: boxkarhobby@aol.com



**Manly R/C Club**, Manly, Iowa 50456; Bruce Hill, (641) 454-2025



**Marble's Raceway**, Des Moines, Iowa 50317; Rick Marble, (515) 262-7507



**Radio Control Raceway Park**, Fort Dodge, Iowa 50501; Bernie Halverson, 515-576-3780 (515-571-1717 Race Day); email: bhalverson@dodge.net



**RiverFront Speedway**, Fort Dodge, Iowa 50501; Bernie Halverson, 515-576-3780 (515-571-1717 Race Day); email: bhalverson@dodge.net



**Wild Bill's Raceway**, Knoxville, Iowa 50138; William Anderson, Jr., 641-842-5973; email: wildbilz@iowatelecom.net; web: www.wildbillsracing.com



## KANSAS

**Air Capital Hobbies Raceway**, Wichita, Kansas 67212, (316) 721-4164



**D&B Raceway**, Menlo, Kansas; Ron Ball, (785) 855-2370

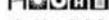


## KENTUCKY

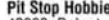
**Coyote Raceway**, Lexington, Kentucky 40505; Danny P., 859-253-9900 or 859-253-9330; email: hyperbola01@earthlink.net; web: www.coyotehobbies.com



**Dixon's R/C RaceWay**, Hazard, Kentucky 41701; Jeff Dixon, (606) 436-4820; email: jeffdr1@hotmail.com



**Mayking R/C Speedway**, Mayking, Kentucky 41837; Jon Fields, 606-633-4700; email: jon1@se-tel.com



**Pit Stop Hobbies**, Paducah, Kentucky 42003; Robert or Rodney, 270-443-0052; email: pitstop1@apex.net



**Trio Hobbies & R/C**, Radcliff, Kentucky 40160; Maurice Johnson, (502) 351-7547

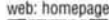


**Wildcat Speedway**, Nicholasville, Kentucky; David Bowles, 859-272-0231



## LOUISIANA

**Fast Pace Hobbies**, Alexandria, Louisiana 71301; Joseph or Casey Toralba, 318-561-2070; email: fastpacehobbies@aol.com



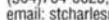
**Gator R/C Raceway**, Moss Bluff, Louisiana 70612; Tony Diaz, 337-855-3206; email: keithsjac@aol.com; web: homepage.mac.com/kmaples/



**Hwy. 44 Hobby Shop**, Gonzales, Louisiana 70737; Eric Olmstead, (225) 644-1773; email: eric209@aol.com



**Red Stick R/C Raceway**, Baton Rouge, Louisiana 70814; Michael Pino, 225-218-1002; email: redstickraceway@aol.com; web: www.redstickraceway.com



**St. Charles RC Speedway**, Destrehan, Louisiana 70047; Al Cazalot, (504) 764-0625; email: stcharlesracer@home.com; web: members.home.net/stcharlesracer



## MAINE

**Central Maine R/C Speedway & Hobbies**, Fairfield, Maine 04963; David Prescott, (207) 453-4588; email: rrcracer@mint.net



**Clay Bowl R/C Hobbies**, Greene, Maine 04236; Pat Cap, (207) 946-5003

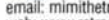


## MARYLAND

**Coles Race Way**, Waldorf, Maryland 20602; Cole Brincefield, (301)-843-1386; email: kbrincefield@cs.com



**GPA Hobbies**, Crofton, Maryland 21114, 301-858-0004



**The Track**, Gaithersburg, Maryland 20877; Mimi Wong, (301) 417-9630; email: mimitracked@yahoo.com; web: www.rctrack.com



## MASSACHUSETTS

**Big Boys Toys**, Fall River, Massachusetts 02723; Track Owner, 508-677-9400



**East Templeton Model Raceway**, Templeton, Massachusetts 01468; Keith Anderson, 1-978-632-1619; email: keith@glowplug.com; web: glowplug.com



**Hi-Tech Hobbies**, Raynham, Massachusetts; Ruben, (508) 880-5373



**Megadrome Raceway**, North Adams, Massachusetts 01247; Bob Blanchette, 413-743-7223



**Northboro Speedway**, Northboro, Massachusetts 01532; Bob Trimble, 508-393-8087 or 393-2691



**R/C Excitement, Inc.**, Worcester, Massachusetts 01605; Todd Anderson, 508-753-8676; email: rcexcitement@aol.com; web: www.rcexcitement.com



**RPM RC Raceway**, Abington, Massachusetts 02531-1094; Richard Tonetti, (781) 857-2300; email: hobtown@AOL.com; web: www.rpmhobbys.com



## MICHIGAN

**Backyard R/C Raceway**, Brown City, Michigan 48416; Tom Jones, (810) 793-0257; email: JONES\_TNT\_2000@YAHOO.COM



**D.R. R/C**, Taylor, Michigan 48180; Bobby or Fred, (734) 287-7405; web: www.downdriverracing.8k.com



**E.U.P.**, Kinceloe, Michigan 49788; Joel Wiggins, 906-495-3503



**Fastraxx**, Brownstown, Michigan 48173; Greg Yingling, (734) 379-8980; email: fast3@hotmail.com



**Freedom Hill R/C Raceway**, Sterling Heights, Michigan 48312; Jim McKenna, (810) 268-3996



**Great Lakes Racers Club**, Grand Rapids, Michigan 49588; John Warner, 616-838-2231; email: GR8LsRacers@aol.com; web: www.rogers.3.com/glr/



**Hideaway Raceway**, Napoleon, Michigan 49201; David Carlisle, 1-517-536-8821; email: adcarlisle1@netscape.net



**Jons Hobby**, Mt. Pleasant, Michigan 48858; Jon Beutler, (517) 773-5412; email: jonshobby@earthlink.net; web: www.jonshobby.com



**JT Superspeedway**, Battle Creek, Michigan 49015; Jerry or Sam, 616-965-0116



**Larry's Performance R/Cs**, Commerce, Michigan 48390; Jess or Oppie, 248-926-1140; email: lprcs@qwest.net



**Larry's Performance RC Carpet Track**, Sterling Heights, Michigan 48314; Larry, 586-997-4840; email: lprcs@qwest.net



**Lazer RC Speedway**, Adrian, Michigan 49221; Russ Johnson, (517) 263-2806



**N.M.R.C.C. Speedway**, Gaylord, Michigan 49735; Gabe, (989) 732-3963; email: hobby-toy@voyager.net



**R&L Hobbies & Racing**, Portage, Michigan 49002; Rex Simpson, (616) 323-3686; web: www.rlhobbies.com



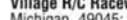
**R.A.C.E. Inc.**, Jackson, Michigan 49203; Sam Sprang, (517) 787-9161



**Raw Roots Race Tracks**, West Olive, Michigan 49460; Roy Bennink, (616) 399-9338



**Village Hobbies**, Hesperia, Michigan 49421; John Fosdick, 231-854-1374; email: vhracing@triton.net



**Village R/C Raceway**, Decatur, Michigan 49045; Chuck Nolke, (616) 423-7878



## MINNESOTA

**Bruce McCullough Memorial R/C Speedway**, Cloquet, Minnesota 55720; Howie Port, (218) 879-5174; email: howies\_house@hotmail.com



**Country R/C Raceway Park**, Belview, Minnesota 56214-8115; Charles L. Steff, 507-641-8115



**J's Radio Control Race Park**, Brainerd, Minnesota 56381; Jay Campbell, (320) 239-4827



**Kevin's Off-Road Raceway**, Crookston, Minnesota 56716-2317; Kevin Altepetter, (218) 281-7523; email: kevin@krcrproducts.com; web: www.krcrproducts.com



**National Speedway**, Fridley, Minnesota 55432; Steve Hedenland, 763-571-9283; email: mrtip@nationalhobby.com; web: www.nationalhobby.com



**Northwoods Hobby Raceway**, Brainerd, Minnesota 56401; John or Doug, (218) 829-9257



**Twin Cities Hobby & Raceway**, Brooklyn Park, Minnesota 55443; Mark O'Brien, 763-569-5069; email: wooduster@msn.com; web: www.twincityhobby.com



## MISSISSIPPI

**Meridian RC Speedway**, Meridian, Mississippi 39302; Joe or Pearce, 601-483-7000



**Small Cars Unlimited**, Jackson, Mississippi 39212; Ed Hill, 601-372-3278; email: fast@smallcarsunlimited.com; web: www.smallcarsunlimited.com





**Real Blue Vue R/C**, Kansas City, Missouri 64133; Steve Hale, (816) 358-0238; email: hrealrc@aol.com; web: www.geocities.com/real\_rc\_raceway

**Real R/C Raceway**, Pleasant Hill, Missouri 64080; Steve Hale, (816) 540-5584; email: hrealrc@aol.com; web: www.real-rc.com

**Showtime Speedway**, Bakersfield, Missouri; Don Risner, (601) 203-1481

## MONTANA

**Garden City R/C Speedway**, Missoula, Montana 59801; Brian Culp, (406) 549-7992; email: gardencityrc@msn.com

**Magic City Racers**, Billings, Montana 59102; Bryan Grummett, 406-656-8266; email: jsaves@tgrsolution.net; web: www.magiccityrc.com

**RC Offroad Association of Racing (ROAR)**, Libby, Montana 59923; Jamie, 406-293-6056; email: shark-boyet@hotmail.com

## NEBRASKA

**Hadar R/C Raceway**, Norfolk, Nebraska 68701; John Schoenauer, (402) 644-7922

**Hobby Town Raceway**, Lincoln, Nebraska 68505; Chris or Chad, 402-434-5056; email: eaststore@aol.com

**Hobby Town USA Raceway Park**, Lincoln, Nebraska 68508; Chad or Chris, 402-434-5056; email: east-store@aol.com

**NESCAR Raceway**, Grand Island, Nebraska 68801; Steve Blayney, 308-382-0920; email: spinkg@nebi.com

**O.N.R.O.A.D.**, Omaha, Nebraska 68104; CoRK Jacobs, (402) 556-8674

**OTWG Carpet Raceway**, Norfolk, Nebraska 68701; John Schoenauer, (402) 644-7922

**The Salvation Army Speedway**, Omaha, Nebraska 68164, 402-734-3414

## NEVADA

**Dansey's Indoor R/C & Hobbies**, Las Vegas, Nevada; David Lugo, (702) 453-RACE or (888) 765-8963; web: www.danseys.com

**Las Vegas R/C Raceway**, Las Vegas, Nevada 89139; Patrick Quinn, 702-365-1396; email: patrick-quinn98@lvcm.com; web: www.lasvegascraceway.com

**T-Rix bikes & R-C shop**, Elko, Nevada 89801; Gary Perkins, (775) 777-8804; email: mtnman14k@hotmail.com

## NEW HAMPSHIRE

**Hilltop RC**, Troy, New Hampshire 03465; Pete Bastoni/Jim MacPherson, 603-242-3222; email: hilltoprc@netze-ro.net; web: hilltoprc.homestead.com

**Lakes Region R/C Speedway**, Gilford, New Hampshire 03246; Louie Blais, 603-524-2909; email: lakeregionrc@hotmail.com; web: www.lakesregionrc.com

**RT 106 Racepark**, Pembroke, New Hampshire 03275; David Daniels, 603-224-7223; email: david@collectracing.com; web: www.106racepark.com

## NEW JERSEY

**America's Hobby Center Inc.**, North Bergen, New Jersey 07047; John Many, (201) 662-0777; web: www.ahc1931.com

**Back Track Raceway**, Hammoncton, New Jersey 08037; Bob W., 609-214-5016

**Checkerboard Raceways**, Elwood, New Jersey 08217; Ray Murray, 856-629-9413; email: RaysTrack@webtv.net

**Family Hobbies Raceway**, Vineland, New Jersey 08360; Linda Vogel, 856-696-5790; email: familyhobbies@yahoo.com; web: familyhobbies.20m.com

**Jackson RC Club**, Jackson, New Jersey 08527; Al Sardo, 732-364-6422; email: Tazzyd@optonline.net; web: www.jacksonRC.com

**Jefferson Speedway**, Oak Ridge, New Jersey 07438; Jim, (973) 697-7525

**Millville R/C Oval & Roadcourse**, Millville, New Jersey 08332; William Denstoz, 856-327-4640

**On Trax Hobbies**, Browns Mills, New Jersey 08015; Joseph DiGirolamo, (609) 735-0422

**PottBellys R/C Speedway**, PittsGrove, New Jersey 08360; Drew Anastasio, 856-875-2132; email: pottbelly@pottbellysrc.com; web: www.pottbellysrc.com

**South Jersey Cost Controlled Racing**, Sicklerville, New Jersey 08081; Ray Murray, 856-629-9413; email: RaysTrack@webtv.net; web: community.webtv.net/RaysTrack/South JerseyCost

**SpeedPro Dragway**, Elizabeth, New Jersey 07206; Albie Niziolek, 908-351-5080; email: tunnycar176@aol.com; web: www.speedpro.org

**The Race Place**, Farmingdale, New Jersey 07731; John Fary, (908) 938-5215

**Wacky RC Raceway**, Roselle, New Jersey 07203; Tony Williams or Kimble Wright, (908) 241-6700

## NEW MEXICO

**Albuquerque R/C Off-Road Raceway**, Albuquerque, New Mexico 87120; Bill Mitchell, (505) 243-0681(W); 898-6181(H); email: email-bill@home.com

**Speed Zone**, clovis, New Mexico 88101; Brad Ferguson, 505 769 1737; email: speedzone@yucca.net

## NEW YORK

**BarnStormers Raceway**, Chester, New York 10918; Lou Sytsma, 845-469-BARN(2276); email: lamsytsma@hotmail.com; web: www.barnstormers.0catch.com/

**Brennan's RC Hobbies**, Vernon, New York; Bill or Tom Brennan, (315) 829-4930

**Brooklyn Hobbies**, Brooklyn, New York 11234; Chris Palermo, 718-951-2500; email: brooklynhobbies@aol.com; web: www.brooklynhobbies.com

**Bruckner Racing**, Bronx, New York 10465; Thomas Baffers Sr., (800)-288-8185

**C&C Speedway**, Binghamton, New York 13903; Eric Boyd, (607) 773-2044

**Capital District Raceway**, Stock Car Club, Loudonville, New York 12211; Peter Willis, (518) 482-7128; email: rcpete12211@yahoo.com; web: cdrcsc.com/homestead.com

**Chipmunk Hill R/C Speedway**, Theresa, New York 13691; Ted or Pete House, (315) 628-5065

**Competition Hobby Supplies & Speedway**, Cohoes, New York 12047; Howie Cummings, 518-786-3622; email: howard.cummings@verizon.net; web: www.competitionhobbysupplies.com

**East Coast R/C Hobbies**, Brooklyn, New York 11204; John Giangrande, 718-627-3814

**Fastraks**, Hogsburg, New York 13655; Mark Castonguay, (518) 358-3686; email: troghobb@north.net; web: www.fastraks.8m.com

**Hobby Zone Raceway**, Ozone Park, New York 11417; Brian, Sean or Adam, (718) 641-9001; email: moonchaserwolf@aol.com

**Lil Wheels Raceway**, Oswego, New York 13126; Bill Meyer, 343-6566; email: lilwheelsraceway@hotmail.com; web: lilwheelsraceway.tsx.org

**Long Island Raceway**, Farmingdale, New York 11735; James, (516) 845-7223; web: www.raceway.com

**MTW Raceway**, Cato, New York 13033; Tim, 888-39-HOBBY; 315-626-2029; email: docsavage@mtwraceway.com; web: www.mtwraceway.com

**PRO Speedway**, Cattaraugus, New York 14719; Marc Pritchard, (716) 257-3101

**Radio Hill Raceway**, Dundee, New York 14837; Bill or Greg, 607-243-8641 (Bill); 607-243-7899 (Greg)

**Rampage R/C & Hobbies**, Hyde Park, New York 12538; Brian Walker, (845) 229-1379

**South Shore Hobby & Raceway**, Coram, New York 11727; Benny or Bonnie, 631-696-8500; email: sshobby@northeast.net; web: www.southshorehobby.com

**Southern Tier Raceway**, Owego, New York 13827; Anita Harding, (607) 687-5395

**TARMAC Ultimate R/C Raceways**, Poughkeepsie, New York 12603; Todd Pluss, 845-342-5409 (Todd); 845-454-8276 (Track-Sundays); email: toddp@tarmacraceway.com; web: www.tarmacraceway.com

**Walt's Hobby**, Syracuse, New York 13209; Bruce, 315-453-2291; web: www.walts-hobby.com

**Willis Hobbies R/C Speedway**, Mineola, New York 11501; Ken Ford, 516-746-3944; web: www.willishobbies.com

## NORTH CAROLINA

**Chatham R/C Raceway**, Bear Creek, North Carolina 27207; Dwight Fields, (919) 898-4518; email: chatham\_rc\_speedway@yahoo.com; web: www.chathamracespeedway.com

**R.C.R. Speedway**, Salisbury, North Carolina 28147; Ronnie Linker, (704) 637-2565

**Race City Motor Speedway**, Mooresville, North Carolina 28115; Ray Kelly, 704-660-FAST; email: Kellyrcmcs@cs.com; web: racecitymotorspeedway.com

**Rosewood RC Speedway**, Goldsboro, North Carolina 27530; Glenn Elam, 919-734-7754; email: gelam49@hotmail.com; web: www.rosewoodrc.com

**Sandhills Raceway**, Southern Pines, North Carolina; Mike Russel, 910-245-4450; email: mrmrc@mindspring.com; web: www.sandhillsraceway.com

**Southern RC Motorsports Club**, Shalotte, North Carolina 28459; Eddie Ferster, (910) 754-8528

**The Antique Barn**, Wilson, North Carolina 27893; Steve, (252) 237-6778; email: antiquebarn@esn.net

## NORTH DAKOTA

**Grand Forks Remote Control Racers**, Grand Forks, North Dakota 58201; Dan Miller, 701-746-9910; email: dandmiller@juno.com; web: mule.puah.org/gfrcr

## OHIO

**AK Hobby & Raceway**, Cincinnati, Ohio 45211; Tim Tolle, (513) 661-7080; email: tim@akhobby.com; web: www.akhobby.com

**American Ohio Sprint Car**, Wickliffe, Ohio 44092; Gary Waldhelm, 440-944-9966; web: www.aosca.8m.com

**Black Swamp RC Car Club**, Toledo, Ohio 43623; Riders Hobbies, 419-843-2931; email: ridersrcclub@webtv.net; web: www.blackswamprc.cjb.net

**CORCAR/Sams Club**, Galloway, Ohio 43119-8732; Bill Stevenson, (614) 870-7159

**D&J R/C Raceway**, Orrville, Ohio 44667; Don, (330) 682-4266

**DeFosse Raceway**, Ripley, Ohio; Greg DeFosse, (937) 377-2063

**Enid R/C Speedway**, Enid, Oklahoma 73703; Darin Pendleton, (580) 554-9400; email: darin@enid.com; web: www.enidrcracing.com

**HobbyTown USA**, Norman, Oklahoma 73072; Todd Jensen, (405) 292-5850

**Wings N Things Raceway**, Tulsa, Oklahoma 74105; Heath Anderson, (918) 745-0007

**Extreme RC Raceway**, Wheelersburg, Ohio; Kevin Rowe, (740) 574-4190; email: extremerc2000@yahoo.com; web: www.ohioxcr.com

**Hobbyland Raceway**, Proctorville, Ohio 45669; Craig Harber, 740-886-0502 or 740-8868062; email: pitrow-eracing@webtv.net; web: hobbyland-raceway.homestead.com

**Medina R/C Raceway**, Medina, Ohio 44256; Mr. Bill, 330-723-0255; email: mr.bill@nls.net

**Mid Ohio Dirt Oval**, Lexington, Ohio 44904; D&D Hobby Center, (419) 884-0001

**Nothing But Air R.C. Track**, Logan, Ohio 43138; Gary Lloyd, 740-385-0288

**Ohio Valley OffRoad R/C Raceway**, Jerusalem, Ohio 43747; Kevin Wilson, (740) 926-1738; email: consol@1st.net; web: www.ovor.8m.com

**Outlaw Speedway**, Lexington, Ohio; Eric Radio, 419-884-0001; email: kramerj@cs.com; web: rdirtoval.freesevers.com

**River Rat Racing**, Ripley, Ohio 45167; Jon Faris, 937-392-9298; email: honey3@bright.net; web: www.riverratraceway (under construction)

**T.S.R.C.A.R.**, Hamilton, Ohio 45011; Dennis Young, (513) 367-5634; email: scalerac@aol.com; web: www.tri-staterautoracers.com

**TARCAR**, Toledo, Ohio 43617; Bill Bridges, (419) 826-3859

**Ultra Racing R/C Hobby and Track**, Hamilton, Ohio 45015; Ed Lewis, 513-863-7342; email: UltraRacing@aol.com; web: www.rcratoracers.com

**Van Wert R/C Raceway**, Van Wert, Ohio 45891; Mark Davis, (419) 232-2112

**Y-City Hobby & Speedway**, Zanesville, Ohio 43701; Kevin McKenna, (740) 455-3025; email: Kevin@ycity-hobby.com; web: www.ycityhobby.com

## OKLAHOMA

**Action Hobbies**, Tulsa, Oklahoma 74145; David Cole, (918) 663-8998; email: acthobii@aol.com

**Action RC Speedway**, Oklahoma City, Oklahoma 73135; Jerry Hawthorne, (405) 670-7770; email: ginna@flash.net; web: www.actionrc.com

**Adams Creek R/C Speedway**, Broken Arrow, Oklahoma 74014; John Beighlie, (918) 355-1416

**Competition R/C**, Oklahoma City, Oklahoma 73149; James or Louise Brown, (405) 634-0809; email: compcr1@aol.com

**Enid R/C Speedway**, Enid, Oklahoma 73703; Darin Pendleton, (580) 554-9400; email: darin@enid.com; web: www.enidrcracing.com

**HobbyTown USA**, Norman, Oklahoma 73072; Todd Jensen, (405) 292-5850

**Wings N Things Raceway**, Tulsa, Oklahoma 74105; Heath Anderson, (918) 745-0007

## KEY TO SYMBOLS

- |   |           |   |                    |
|---|-----------|---|--------------------|
|  | Indoor    |  | Concrete           |
|  | Outdoor   |  | Asphalt            |
|  | Off-road  |  | Minis & Micros     |
|  | On-road   |  | On-site hobby shop |
|  | Oval      |  | AC power           |
|  | Dirt oval |  | Auto lap counting  |
|  | Carpet    |  | Food available     |



## OREGON

**Competition Racing Association,** Portland, Oregon 97230; Mark Taylor, (503) 761-1334; email: crajodi@quest.net or cra-mark@quest.net; web: home.attbi.com/~cra/

**Dirt City RC,** Albany, Oregon 97321; Doug Vertrees, (541) 791-1089; email: quicktemperrc@aol.com

**R/C Plus Hobbies Raceway,** Salem, Oregon 97302; Ron Smith, (503) 364-9188; email: rcplus@rcplus.com; web: www.rcplus.com

**R/C Speed Center,** Medford, Oregon 97501; Gene & Betty Jean Skelton, (541) 779-8298

**Rose City Scale Racing,** Milwaukie, Oregon 97222; Rick Strauss, (503) 631-2929; web: www.rc-cars.com

## PENNSYLVANIA

**Bumps & Jumps RC Speedway,** Middletown, Pennsylvania 17057; Chris McKinney, 717-728-4613; email: chrismc@bigfoot.com; web: www.bumpsandjumpsrsc.com

**Courtview Raceway,** Washington, Pennsylvania 15301; Aaron Stimmel Jr., 724-228-8396

**DC Ultra Trax,** Warminster, Pennsylvania 18974; David Cowan, (215) 672-5200; web: www.jcrhobbies.com

**Dreamboat Hobbies,** Warren, Pennsylvania 16365; Louie Dussia, (814) 723-8052; email: dreamboat77@yahoo.com

**J&K Hobbies and Raceway,** Jersey Shore, Pennsylvania 17740; Jason Corter or Kevin Casbeer, 570-398-8171; email: rcmaniac01@msn.com

**Kranzels R/C Raceway & Hobbies,** Lemoyne, Pennsylvania 17043; David or Stuart Kranzel, (717) 737-7223; web: www.kranzelsrchoobbies.com

**Little Plum R/C Hobbies,** Lock Haven, Pennsylvania 17745; Larry Duck, (570) 769-1984

**Marshall's R/C Raceway,** Honesdale, Pennsylvania 18431; Bill or Dot Marshall, (570) 729-7458

**McCullough's Offroad,** Sarver, Pennsylvania 16055; Doug McCullough, (724) 352-0116; email: DMcCull323@aol.com

**Newville RC Speedway & Hobbies,** Newville, Pennsylvania 17241; Randy or Mike, 717-776-5568; email: newvillersspeedway@yahoo.com; web: www.newvillersspeedway.com

**Pit Stop Hobbies,** Mount Joy, Pennsylvania 17552, (717) 653-6222; email: pitstophobbies@pitstophobbies.net; web: www.pitstophobbies.net

**Racers Edge R/C Racing & Hobbies,** Smethport, Pennsylvania 16749; Rick Morgan or Johna Simar, (814) 887-9258; email: racersedgerc@mindspring.com; web: www.racersedgerc.com

**RB Motorsports & Hobby,** Northumberland, Pennsylvania 17857; Rick Bunting, (570) 473-8711

**RC Avenue II,** Bradenville, Pennsylvania 15650; Chris Demyan, 724-537-9592; email: 12ss@msn.com

**RC Dirtburners Club,** Windber, Pennsylvania 15963; Bruce Schmidt, (814) 266-4118; email: rckidd1@cs.com

**RC Outfitters RCO Raceway,** Hanover, Pennsylvania 17331; Chris Shaffer, (717) 633-9490; web: www.rcohobbies.com

**Riverside Raceway,** Warren, Pennsylvania 16365; Jeff, (814) 723-4211

**Staub Bros. R/C Speedway,** Gettysburg, Pennsylvania 17325; Todd or Scott Staub, 717-334-8488; web: www.staubbrothers.com

**The Hobby Depot,** Malvern, Pennsylvania 19320; Chris McGovern, 610-725-8317

**The Raceway at River Junction,** Beaver, Pennsylvania 15009; Sam or John, (724) 728-5571; email: riverjct@stargate.net

**Thunder Hobbies Raceway,** Indiana, Pennsylvania 15701; Brent or Lori Marshall, (724) 349-2639; email: thunderhobbies@hotmail.com

**Track 84,** Narran, Pennsylvania 17555; Andrew Flexer, (717) 354-6503

**Trains & Lanes Raceway,** Easton, Pennsylvania 18045; Jeff Setzer, (610) 253-8850 or (800) 447-4891; email: trainslanes@aol.com

**TRP,** Kingston, Pennsylvania 18704; Rob Yeager, 570-283-3066; email: rcrb99@aol.com

**WillCam Raceway,** Punxsutawney, Pennsylvania 15767; James Campbell, (814) 939-4251

## PUERTO RICO

**Bayamon R/C Park,** Bayamon, Puerto Rico 00956; Damian Cruz & Javier Rivera, (787) 869-8092 & 401-2770; email: damian@bayamonrcpark.com; web: www.bayamonrcpark.com

**Hacienda MuOz R/C Track,** Juana Diaz, Puerto Rico 00795, (809) 837-7083

**Hi-Speed C Raceways,** San Juan, Puerto Rico 00926; Carlos Ortiz, (787) 283-0198; email: hispeed@hotmail.com; web: www.hispeedhobby.com

**Mech Tech Touring Park,** Caguas, Puerto Rico 00725; Humbert (Tito) Lizardi, (787) 739-1572; email: tlizardi@hotmail.com

**Tropical Raceway Track,** Manati, Puerto Rico 00674; Hector Pabon/George Pabon, (787) 854-8884 or (787) 884-9294; email: trophob@coqui.net

## RHODE ISLAND

**Insane Toys RC race track,** Providence, Rhode Island 02909; Jose Jimenez, (401) 421-8878; email: Havokt@aol.com; web: members.home.net/havokt/

**SK Hobbies Inc.,** Johnston, Rhode Island 02919; Slim or Keith, (401) 453-1440

## SOUTH CAROLINA

**Atomic Racers,** Aiken, South Carolina 29803; Bill Jackson, 706-855-0846 or 803-725-1664

**Carolina R/C Speedway,** Easley, South Carolina 29640; David, 864-295-1209; email: cprahlr@mindspring.com; web: www.carolinarc.com

**D&S Hobbies R/C Track,** Hartsville, South Carolina 29550; Don Dietz, 843-383-0017; email: dshobbydon@aol.com; web: www.dshobbies.com

**Darlington R/C Raceway at Hobbies & More,** Darlington, South Carolina 29532; Jerry Pollard, (843) 393-0355; web: www.hobbiesmore.com

**Hi Voltage Raceway,** Anderson, South Carolina 29625; Whitner Bowen, 1-864-225-8680; email: Jahlon247@aol.com

**The Grove Racing Center,** Rockhill, South Carolina 29730; Don Faris, (803) 327-4121; web: www.hobbystop.com

## SOUTH DAKOTA

**Action R/C Raceway,** Mitchell, South Dakota 57301; Royal or Roger, Royal-day-605-996-9871; Roger-eve-605-996-2897; email: pioneer@santel.net

**Boomerangs Raceway,** Hartford, South Dakota 57033; Ed Smithback, (605) 528-7345

**Dakota Off-Road Racers,** Aberdeen, South Dakota 57401; Kevin, 605-225-5223

**Grassland Racers,** Black Hawk, South Dakota 57718; Ryan Logan, (605) 787-5632

**SBK,** Winner, South Dakota 57580; Broc Stout, (605) 842-2699

## TENNESSEE

**Hobby Town USA,** Franklin, Tennessee 37067; Bobby Mills, (615) 771-7441; email: htu126@aol.com

**MSA R/C Racing,** Crossville, Tennessee 38555; D.R. Findley, (931) 456-0027

**Need For Speed Raceway R/C,** Chattanooga, Tennessee 37415; Ronnie Cox, (423) 876-9019

**RC Speedway,** Cleveland, Tennessee 37323; James Morgan, 423-472-7854 or 645-5771; email: jmorga59@bell-south.net

**Robertson's R/C Raceway,** Jackson, Tennessee 38301; Travis Robertson, 731-423-6984; email: RobertsonsRC@aol.com

**SpeedZone Raceway & R/C Hobbies,** Sweetwater, Tennessee 37874; Mike Henderson, 423-351-0055; email: speedzon@msn.com; web: www.speedzonraceway.com

**W.O.W. Raceway,** Beech Bluff, Tennessee 38313; Brad Jones, 731-427-1625; email: wowracer@bell-south.net; web: go.to/wowracing

## TEXAS

**215 Speedway,** Abilene, Texas 79602; Clyde Gardner, (915) 673-2351

**Al's Hobbies,** San Antonio, Texas 78227; Alfonso Robles or Mark Beasley, 830-645-1050; email: alshobbies@usa.com; web: www.alshobbiesusa.com

**Austex RC,** Austin, Texas 78757; Michael, 512-458-2324; web: www.austexrc.com

**B&B R/C Hobbies,** Big Spring, Texas 79720; Walter Bumbulis, (915) 263-1790; email: b&brchobbies@apex2000.net

**Big Mike's R/C Raceway,** Longview, Texas 75604; Mike Sumrow, 903-297-7814

**Drycreek Raceway,** Greenville, Texas 75402; Micky Alphin, 903-527-5381; web: web.pulse.net/drycreek

**Finishline Raceway,** Hurst, Texas 76053; Damon Darnall, (972) 404-0463; email: Finishline@ev1.net; web: www.finishlinetrack.com

**Hal's Hobby Raceway,** El Paso, Texas 79936, (915) 591-2213; web: www.halshobbywarehouse.com

**Hobby Center Race Track,** Houston, Texas 77598; Issac Ben-Ezra, 281-488-8697; email: Hobbycenter@issac-smodels.com; web: www.hobbycenter.cc

**Hobbytown USA,** San Antonio, Texas 78209; Clark, (210) 829-8697; fax (210) 829-8707

**Indy R/C World,** Garland, Texas 75041; Steve Webster, (972) 271-4844; fax (972) 271-4502; web: www.indyrcworld.net

**Js Action R/C,** Pasadena, Texas 77503; Jack Williams, 713-946-8888; email: jayactionrc.net; web: www.jsactionrc.com

**K&M Racing,** New Caney, Texas 77357; Brent Mahaffy, (281) 399-9777

**M&M Hobby Center,** Bellaire, Texas 77401; Meir Ben-Ezra, 713-661-7137; email: mandm@mmhobby.com; web: www.mmhobby.com

**MBRC,** Dallas, Texas 75093; Mike Battelle; email: info@mbrc-racing.com; web: www.mbrc-racing.com

**Mike's Hobby Shop Superstore & Raceway,** Carrollton, Texas 75006, 972-242-4930; web: www.mikes hobbyshop.com

**Reflex R/C,** Houston, Texas 77055; Joseph Chen, (713) 464-4458; web: www.reflexrc.com

**T&M Raceway R/C Drag Racing,** Addison, Texas 75244; Marvin Jackson, (972) 416-0445; email: mjackson@tmraceway.com; web: www.tmraceway.com

**T&T R/C Cars,** Plano, Texas 75024; Joe Sullivan, (972) 633-2470

**The Rollcage,** Greenville, Texas 75402; Guy Allen, (903) 883-0332; email: rollcage2000@therollcage.com; web: www.therollcage.com

**Thompsons RC Raceway,** Lufkin, Texas 75901; Mark Thompson, (936) 637-0093

**W.E.S. Hobby Race,** Beaumont, Texas 77664; Jef Santos, (512) 310-0444 or (512) 388-3819

## UTAH

**Hobbie Stop Raceway,** Riverdale, Utah; Todd Hamilton or Beazer Martin, (801) 622-0841

**X-Treme Hobbies,** Round Rock, Texas 78664; Jef Santos, (512) 310-0444 or (512) 388-3819

**Intermountain R/C Raceway,** Magna, Utah 84044; David Mott, 801-250-8303; email: rcmother1@aol.com; web: members.aol.com/rcmother1

**Outback Raceway,** Ogden, Utah 84404; Steve Brown or Beazer Martin, 801-726-3458; email: Steve@mrccr.com or Beazer@bibbs.com; web: www.mrccr.com or www.beazershobbies.com

**Vision Hobby,** Orem, Utah 84057; Ken Rice, (801) 226-6226

## VERMONT

**Empire Hobbies Off-Road Raceway,** Saint Albans, Vermont 05478; Scott or Jen, 877-446-2243; email: empirehobbies@surfglobal.net; web: www.vtwebs.com/empire-hobbies

**R/C Toy Box Hobbies & Tracks LLC,** East Haven, Vermont 05837; Raymond Richard, 802-467-8458; email: rctoybox@excite.com; web: myrctoybox.50megs.com

## VIRGINIA

**Brad's Hobbies,** Staunton, Virginia 24401; Brad, (540) 885-3642; email: bradshobbies@rica.net

**Brown Brothers Hobbies,** Dumfries, Virginia 22026; Joe or Bob Brown, 703-221-5746; email: joe@bbhobbies.com; web: www.bbshobbies.com

**DRCW Raceway,** Virginia Beach, Virginia 23454; Les Modlin, 757-340-6681; web: www.drbiesrcworld.com

**Hampton Beach R/C Drag Club,** Virginia Beach, Virginia 23452; Garry Nelson, 757-399-8645; email: Garry@gsdragracing.com; web: www.HRRCDC.com

**KC's Radio Control & Repair,** Lynchburg, Virginia 24503; Curtis or Kim Wright, (804) 384-8596

**Linville Hobbies Raceway,** Linville, Virginia 22834; Jerry Shenk, (540) 833-2222; email: linvillehobbies@juno.com; web: www.linvillehobbies.com

**Olde Towne Hobby Shoppe,** Manassas, Virginia 20110; Jeff Gough, (703) 369-1197; web: www.olde townehobby.com

**Roanoke R/C Club,** Salem, Virginia 24153; Chad Trent, 540-314-6257; email: roanokerc@aol.com; web: roanokerc.cjb.net

**Shamroc Raceway,** Winchester, Virginia 22601; Paul Wilson, 301-478-5355; web: www.shamroc.homestead.com/front-page.html

**Stream Hobby Shop,** Newport News, Virginia 23605; Rusty Kennedy, 757-591-0720; email: streamrc@aol.com; web: streamhobbyshop.com

**The Tiltyard,** Dayton, Virginia 22821; Homer, 540-828-3476; email: homer@tiltyard.com; web: www.tilyard.com

**Thunder Road RC Speedway,** Gordonsville, Virginia 22947; Robert Binger, 434-296-6549; email: tripod@thunderoadrc.com

**Tidewater R/C Speedway, Inc.,** Hampton, Virginia 23663; Jim Pike, Rob Marsette, Dave Pritchard, (757) 723-8927; email: zeeaya31@hotmail.com



## WASHINGTON

**A-Main Raceway**, Vancouver, Washington 98685; Monty Coleman, (360) 571-8404; web: [www.ainmainraceway.com](http://www.ainmainraceway.com)



**Burien Toyota R/C**, Seattle, Washington 98148; Ray Meek, (800) 654-6456

**Cedardale Raceway**, Mount Vernon, Washington 98273; Craig, (360) 755-9464

**Fantasy World Raceway**, Tacoma, Washington 98408; Dave Kleinman, (253) 473-6223; email: [sales@fantasy-worldhobbies.com](mailto:sales@fantasy-worldhobbies.com); web: [www.fantasyworldhobbies.com](http://www.fantasyworldhobbies.com)

**Four Season R/C Racing**, Olympia, Washington 98506; Gary and Sharon Brown, (360) 491-2430

**Hank Perry Raceway**, Spokane, Washington 99023; Hal Hudson, 509-879-3503; email: [halshudson@msn.com](mailto:halshudson@msn.com)

**HobbyTown USA**, Tacoma, Washington 98408; HobbyTown USA Shop, (253) 474-7787

**HobbyTown USA**, Lynnwood, Washington 98037; Rich or Jamie, 425-774-0819; email: [RHOBYYTOWN@AOL.COM](mailto:RHOBYYTOWN@AOL.COM)

**Paradise Raceway and Hobbies**, Spokane, Washington 99207; Mark, 509-483-1843; email: [paradiserc@hotmail.com](mailto:paradiserc@hotmail.com); web: [www.webbellers.com/paradise](http://www.webbellers.com/paradise)

**Race City**, Auburn, Washington 98002; Bruce, (253) 939-2515; email: [auburn@pacifier.com](mailto:auburn@pacifier.com)

**Rain City RC Raceway**, Mukilteo, Washington 98021; Pete or Debbie Cartwright, 425-438-2454; email: [info@raincityraceway.com](mailto:info@raincityraceway.com); web: [www.raincityraceway.com](http://www.raincityraceway.com)

**Redmond Hobbies Raceway**, Redmond, Washington 98052; Stan Ng, (425) 885-3639; email: [info@redmondhobbies.com](mailto:info@redmondhobbies.com); web: [redmondhobbies.com](http://redmondhobbies.com)

**Schmidt's Auto Parts**, Marysville, Washington 98271; Jon Failla, (360) 653-8838; web: [www.schmidtsraceraceway.com](http://www.schmidtsraceraceway.com)

**Spokane Indoor Raceway**, Spokane, Washington 99212; Brian Batch, 509-487-2122

**Tacoma R/C Raceway**, Tacoma, Washington 98406; Scott Brown, (253) 565-1935; web: [www.tacomarcraceway.com](http://www.tacomarcraceway.com)

**West Coast Hobby & Raceway**, Richland, Washington 99352; Darren Shank, (509) 375-4995

## WEST VIRGINIA

**Burr Fab R.C. Raceway**, West Union, West Virginia 26456; Mark Travis, 304-873-2487; email: [burrhouse1@cs.com](mailto:burrhouse1@cs.com)



**Fulton's R/C Raceway**, Wheeling, West Virginia 26003; James Fulton, (304) 233-5355



**Mountbourn Raceway**, Vienna, West Virginia 26105; Tom Allen, 304-295-3234; email: [ryan@ovrccc.com](mailto:ryan@ovrccc.com); web: [www.ovrccc.com](http://www.ovrccc.com)

**Quiet Dell Raceway**, Fairmont, West Virginia 26554; Darris, (304) 366-1441; email: [Tateracing@aol.com](mailto:Tateracing@aol.com)

## WISCONSIN

**ABC R/C Inc & Raceway**, Waukesha, Wisconsin 53186; Dick Mathieson, 262-542-1245; email: [Help@abchrchobby.com](mailto:Help@abchrchobby.com); web: [www.abchrchobby.com](http://www.abchrchobby.com)

**Best's Hobbies**, Appleton, Wisconsin 54914; Peggy, 920-734-5244; email: [appletonrc@hotmail.com](mailto:appletonrc@hotmail.com); web: [www.besthobbies.com](http://www.besthobbies.com)

**Gary's Hobby Center**, Racine, Wisconsin 53403; Bill Phalen, 262-554-8884

**HobbyTown USA - Revolution Raceway**, Sheboygan, Wisconsin 53081; Kenny, (920) 452-0801; web: [www.hobbytownsheb.com](http://www.hobbytownsheb.com)

**KDM Raceway**, Abbotsford, Wisconsin 54405; Kevin Michlig, 715-223-4414; email: [kdmhobby@pcpros.net](mailto:kdmhobby@pcpros.net); web: [kdmhobby.homestead.com/kdmhobby.html](http://kdmhobby.homestead.com/kdmhobby.html)

**MARCCA Raceways**, Monticello, Wisconsin 53570, 608-243-1778; email: [asylumrc@yahoo.com](mailto:asylumrc@yahoo.com); web: [www.marcca.com](http://www.marcca.com)

**Mid-West Tri-Clone/Tri-Clone Off-Road**, West Bend, Wisconsin 53095; Dave Hilpert, 262-334-0429 or 262-626-2238; email: [mwtc@hnet.com](mailto:mwtc@hnet.com); web: [www.triclone.com](http://www.triclone.com)

**Pro-Star Racing**, Green Bay, Wisconsin 54301; Chuck or Terry, (920) 494-1233 or (920) 469-5566

**S&N's Trackside Hobbies and Raceway**, Milwaukee, Wisconsin 53005; Scott Ernst, 262-783-4699; email: [sernst@trackside.com](mailto:sernst@trackside.com); web: [www.trackside.com](http://www.trackside.com)

**The Shorthalf Raceway**, Eau Claire, Wisconsin 54701; Scott Schoettie, 715-838-8350; email: [Scottschoettie@mcleodusa.net](mailto:Scottschoettie@mcleodusa.net)

**West Coast Hobby & Raceway**, Richland, Washington 99352; Darren Shank, (509) 375-4995

## WYOMING

**Xtreme Hobbies Raceway**, Gillette, Wyoming 82718; Krieg Balls, 307-682-6077; email: [xtreme@vcn.com](mailto:xtreme@vcn.com)

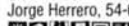


## ARGENTINA

**Circito R/C Lobos**, Lobos, Buenos Aires 7240; Rupert Bruce, 54-02227-422905; email: [rclobos@yahoo.com](mailto:rclobos@yahoo.com); web: [www.rclobos.8m.com](http://www.rclobos.8m.com)

**Circuit M.R. Models**, Buenos Aires 1428; Maximiliano Roballos, 54 11 4557 1000, fax 4780 1677; email: [info@kyosho-argentina.com.ar](mailto:info@kyosho-argentina.com.ar); web: [www.kyosho-argentina.com.ar](http://www.kyosho-argentina.com.ar)

**Club A. Velez Sarsfield**, Buenos Aires; Jorge Herrero, 54-01-658-5851



## AUSTRALIA

**A.C.T. Model Car Racing Club**, Wanniasa, ACT; Gary Davey, 61-6-2871411

**A.C.T. Remote Control Car Club**, Kambah, ACT; Rob Jorgensen, 61-2-6231-9925; email: [bjorgo@isr.gov.au](mailto:bjorgo@isr.gov.au); web: [users.bigpond.net.au/grj/actrcrcc.html](http://users.bigpond.net.au/grj/actrcrcc.html)

**Aubry R/C Car Club**, Aubry, New South Wales 2640; Ron Langman, 060-247-128

**Brisbane Dirt Racing**, Brisbane, Queensland 4053; Jeff Chandler, 07 3355 7476, 041 783 3201; email: [smeg666@bigpond.com](mailto:smeg666@bigpond.com); web: [www.gofast.to/race](http://www.gofast.to/race)

**Canberra Off-Road Model Car Club**, Narrabundah, ACT 2604; Graham Brown, 61-6-241-3070

**Carine R/C Model Car Club, Inc.**, Greenwood, Western Australia; David Werner, 61-418922966

**Castle Hill Radio Control Off Road Car Club**, Castle Hill, New South Wales 2754; Peter Ellis, 0412 257 353; email: [chrcrcc@nextcentury.com.au](mailto:chrcrcc@nextcentury.com.au); web: [www2.nextcentury.com.au/chrcrcc](http://www2.nextcentury.com.au/chrcrcc)

**Central Coast ORRCC**, Bateau Bay, New South Wales 2261; Peter J. Knight, 61-433-693-698

**Illawarra RCECC**, Albion Park Rail, New South Wales 2527; Mel or Andrew, 042-714-683

**Lakeside R/C Racing Car Club**, Lansvale, New South Wales 2166; R. Bartolozzi, 62-2-907-9800

**Melton Electric Circuit Car Association**, Melton, VIC 3337; Arthur Joslin, 61-3-9747-8805

**Monaro Radio Control Car Club**, Queanbeyan, New South Wales 2902; Graham Brown, 02 6241 3070; email: [gbrown@webone.com.au](mailto:gbrown@webone.com.au); web: [www.webone.com.au/~gbrown/mrccc/index.html](http://www.webone.com.au/~gbrown/mrccc/index.html)

**NSW Indoor R/C Raceway**, Hurstville, Sydney 2220; Anthony Lee or Walter Ly, 02-9585-8810

**Penfield Park**, Adelaide, South Australia 5108; Trevor U'New South Walesorth, (618) 8289-5010

**R.C. Speedway**, Newcastle, New South Wales 2300; Andrew Dillon-Smith, 02-49265966

**TFTR - Templestowe Flat Track Racers**, Templestowe, Victoria 3106; Nigel George, see website; email: [tftr@imagefile.net](mailto:tftr@imagefile.net); web: [drive.to/tftr](http://drive.to/tftr)

**The Bayside Raceway**, Brisbane, Queensland 4178; Nigel Bell, 07 3893 1864; email: [mwr1@dingoblue.net.au](mailto:mwr1@dingoblue.net.au)

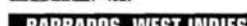
**Victorian Radio Control Drag Racing Association**, Melbourne, VIC 3940; John de Tracy, 03 59820459; email: [bjrno1@hotmail.com](mailto:bjrno1@hotmail.com); web: [www.ozemail.com.au/~john59/index.html](http://www.ozemail.com.au/~john59/index.html)

**Wee Waa's Offroad RC**, Burren Junction, New South Wales 2386; Shane, 61-02-6796-1339

**Wodonga R/C Car Club**, Wodonga, VIC 3690; Paul Townsend, 02-6056-0706; email: [townsend175@ozemail.com.au](mailto:townsend175@ozemail.com.au)

## AUSTRIA

**RMC-Wien**, Vienna A-1220; Herbert Holze/Martin Hrzak, +43-664-4730376



## BARBADOS, WEST INDIES

**R.O.A.R. (Radio Operated Auto Racing)**, St. Michael; Marva Clarke, (246) 427-3907



## BELGIUM

**ATR-Alka-Tele-Racing**, Limburg; Alken, 0032-11-25-49-03

**MBV-Kampenhout**, Kampenhout B1910; Frank Mostrey, 0-16-65-75-18

**Model Racing Club Oudenaarde (MRCO)**, 9700 Oudenaarde; Nicky Delmonte, and fax: 32 55 30 36 25; email: [mrco\\_racing@hotmail.com](mailto:mrco_racing@hotmail.com); web: [mrco-racing.tripod.com](http://mrco-racing.tripod.com)

**MRCZ**, De Burg; Montie, 75-71-63

**R.C.R.**, Retie 2470; A. Eelen, 32-14-379685



## BRAZIL

**AGARC Associaçao Goiana de Automodelismo Radiocontrolado**, Aparecida de Goiânia, GO 74980-070; Zeca, Carol, Warner or Rodrigo, 062 9979 9009; email: [zeca.net@terra.com.br](mailto:zeca.net@terra.com.br)

**Amoc Cassociacao de Modelismo B. Camborio**, Bal. Camborio, South Carolina 88.330-000; Leo Cesar, (047) 366-0001

**Brasilia R/C Motor Circuit**, Brasilia, DF 70000; Alexandre (Alex), 55-061-273-7205

**C.A.A.R. Curitiba Associacao de Automodelismo Radiocontrolado**, Curitiba, Puerto Rico 82650-530; Ronaldo Assumpcao, 55-41-354-2804

**Electric Car Club R/C Santos**, Santos, Sao Paulo 11065-001; Estevam or Arnaldo, 55-013-232-2536

**Hobby Center**, Brasilia, DF 70.273, 061-242-0488

**Hobby Planet Racing Club**, Campinas, Sao Paulo 13091901; Daniel, Helio, Luciano, 019 258 2768

**Jungle Drive**, Rio de Janeiro, PB 21940-490; Paulo Brito, (021) 396-0851 or (021) 393-7449

**Off Roaders**, Sao Paulo, CEP 05640; Waldir Ielpo, (055) 011-260-5628; fax (055) 011-831-4931

**Prince George Radio Controlled Car Club**, Prince George, British Columbia V2M 5R9; Doug Waller, 250-561-0035

## CANADA

**ATN**, Saint-Jean-Baptiste-de-Nicolet, Quebec J3T 1E5; Louis Durand, (819) 293-6097; email: [durand@sogetel.net](mailto:durand@sogetel.net); web: [public.sogetel.net/ldurand/](http://public.sogetel.net/ldurand/)



**Battlefield R/C Raceway**, Cobourg, Ontario K9A 2G3; Tony Hopcraft, (905) 373-8373; email: [tonyhpcraft@yahoo.com](mailto:tonyhpcraft@yahoo.com); web: [www.geocities.com/battlefield\\_rc\\_raceway/](http://www.geocities.com/battlefield_rc_raceway/)

**C.A.R.C.A.R.**, Calgary; Simon Smith, (403) 280-9040; web: [www.drive.to/carcar](http://www.drive.to/carcar)

**Cactus Speedway**, Ruthven, Ontario N0P 2G0; Terry Torell, (519) 735-7122; email: [osthunder@sympatico.ca](mailto:osthunder@sympatico.ca); web: [www.mnsi.net/~glenn/sparc.htm](http://www.mnsi.net/~glenn/sparc.htm)

**Cam R/C**, Coquitlam, British Columbia V3E 1K9; Roger Brown, 604-945-3888

**Circuit J.C.**, St. Polycarpe, Quebec J0P 1X0; Jean Castellon, (403) 280-3675

**Circuit Teleguide ST Roch**, ST Roch De L' Achigan, Quebec J0K 3H0; Gerald Beauchamp, 450-588-4254; email: [gedoroam@colba.net](mailto:gedoroam@colba.net); web: [www.gcrs.com](http://www.gcrs.com)

**Copetown Raceway**, Copetown, Ontario; Adam Filipowicz; email: [adamfilip@home.com](mailto:adamfilip@home.com); web: [copetown-raceway.8k.com](http://copetown-raceway.8k.com)

**Dynamic Hobbies**, Nepean, Ontario K2E7S4; Fred Zufelt, (613) 225-9634; web: [www.members.home.net/rcot-tawa](http://www.members.home.net/rcot-tawa)

**HobbyHobby P.L.R.C.**, Mississauga, Ontario L5M 1K8; Tom Bakonyi, 905-858-7978; email: [info@hobbyhobby.com](mailto:info@hobbyhobby.com); web: [www.hobbyhobby.com](http://www.hobbyhobby.com)

**Honda House Motor Speedway**, Chatham, Ontario N7M 1P9; John Elliot, (519) 354-5530

**IROCC**, Victoria, British Columbia V9B 5W9; Daryl Jones, (250) 478-8013; email: [djbones@shaw.ca](mailto:djbones@shaw.ca)

**Johns Jump & Grind R/C Track**, Waterville, Nova Scotia B0P 1V0; John Egan, 902-538-8920; email: [john.egan@ns.sympatico.ca](mailto:john.egan@ns.sympatico.ca); web: [www.jiagrc.com](http://www.jiagrc.com)

**J-T International Raceway**, Napanee, Ontario K7R 8A1; N. O'Neill, (613) 354-0099

**Kays Hobbies R/C Raceway**, Moorefield, Ontario N0G 2K0; Doug Kay, 519-638-9990; email: [dougk@golden.net](mailto:dougk@golden.net); web: [www.kayshobbies.place.cc](http://www.kayshobbies.place.cc)

**Leading Edge R/C Speedway**, Kingston, Ontario K7M 3Y5; Mike and Tony Daicar, 613-389-4878

**Mid-Canada R/C Auto Racing**, Winnipeg, Manitoba R2J 4E6; Jason McBride, 204-231-3324; email: [hjmcbr@escape.ca](mailto:hjmcbr@escape.ca); web: [www.geocities.com/midcanadarcautotrac](http://www.geocities.com/midcanadarcautotrac)

**Miniatures & Passions**, Ste. Therese, Quebec J7E 2B4; Gilles Lachance, (450) 979-7989

**Mini-Z Hobby Shop**, Markham, Ontario L3R 0W4; Brian Pong, (905) 940-0898; email: [info@minizhobbyshop.com](mailto:info@minizhobbyshop.com); web: [www.minizhobbyshop.com](http://www.minizhobbyshop.com)

**Prince George Radio Controlled Car Club**, Prince George, British Columbia V2M 5R9; Doug Waller, 250-561-0035

## KEY TO SYMBOLS

- |  |           |  |                    |
|--|-----------|--|--------------------|
|  | Indoor    |  | Concrete           |
|  | Outdoor   |  | Asphalt            |
|  | Off-road  |  | Minis & Micros     |
|  | On-road   |  | On-site hobby shop |
|  | Oval      |  | AC power           |
|  | Dirt oval |  | Auto lap counting  |
|  | Carpet    |  | Food available     |



**R/C Champ Raceway**, Scarborough, Ontario M1H 3A4; Ben, Matthew or Louie, (416) 289-8717; web: www.rcchamp.com



**R/C Fanatic**, Charlesbourg, Quebec G1G 3Y4; Marc Page (Club President), 418-265-2678; email: info@rcfanatic.com; web: www.rcfanatic.com



**Recreation R/C Raceway**, Prince George, British Columbia; Doug Waller, (604) 561-0035



**Steeltown Speedway**, Binbrook, Ontario L0R 1C0; Trevor Harrison, 905-692-3407 (ask for Trevor); email: the\_prodigy@zdnetwork.com; web: www.geocities.com/s\_speedway



**Sudbury Organized Auto Racing**, Val Caron, Ontario P3E 1E6; Brad Peacock, 705-897-1435(Brad); email: soarsudbury1@hotmail.com



**The All New R.C. World**, Hamilton, Ontario L0R 1W0; Dave, Larry or Brian, (905) 765-2301 or (905) 333-3297



**Vancouver R/C Road Racers**, Coquitlam, British Columbia V3E 1K9; Roger Brown, (604) 945-3888



## CHILE

**Nico Prohens Off/On Roaders**, Ovalle, 4 Region 1; Nicolas Prohens, (56) 53-711579; email: nprohens@entelchile.net; web: 38939070.home.icq.com/

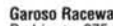


**OFF/ON ROADERS**, Santiago, Region Metropolitana 1; Mauricio Wetter Ferrer, (56) 09-8404174; email: mwetter@entelchile.net; web: 38939070.home.icq.com/



## COLOMBIA

**Club De Automodelismo Colombiano**, Sanatafe De Bogota D.C., Bogota; Jorge Delgado, 1-6130588



**Garoso Raceway**, Cucuta; Gabriel Rodriguez, 975-751892



## COSTA RICA

**Club de Automodelismo RC10 Costa Rica**, San Jose, San Jose; Osvaldo Avera, (506) 2862353; email: nitrocr@hotmail.com



**Hobbymania**, Hispanidad San Pedro, Montes de Oca; Randall Jimenez, 506-280-9078; email: hobbymanias-tore@hotmail.com; web: www.hobbymanias.com



## CYPRUS

**Racing Model Club**, Nicosia; Andrea Sotiriou, 493186; fax 493229

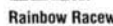


## DENMARK

**Brondby Motor Club**, Brondby; Soren Boy Holst, 45-36-472-462



**Holstebro R/C Buggy Club**, Holstebro 2600; Michael Brushholt, 45-97-412-734



**Klub 144 Raceway**, Lyngby 2800; Henrik Carstens, 45-42-88-3691



**Rainbow Raceway**, Copenhagen 2600; P. Christiansen, 45-52-848-504



**Thor Minirace Odense**, Odense N 5240; Ulrich Rasmussen, 45-65-303-707

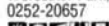


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**Adoca R/C Speedway**, Santo Domingo, (809) 220-5266



**La Barranquilla R/C International Speedway**, Santiago, (809) 582-2303

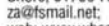


## ENGLAND

**Chessington Radio Car Club**, Worcester Park, Surrey; Ian Spiller, 0252-20657



**Hampshire Racing Center**, Basingstoke, Hampshire; Tony Eudola, 44-1276-61402



**Hinckley RCCC**, Hinckley, Leicestershire; Bruce, 01455-890580



**Snetterton Market Model Car Club**, Norwich, Hampshire NR16 2JU; Lee Shore, 01760 724857; email: kekeza@tmail.net; web: www.wheelspins.co.uk



**Worcester Model Car Club**, St. John's, Worcester WR2 6Q9; Mr. Hardy

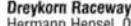


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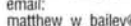
**Auto Electron**, Limoges 87000; M. Boudoul, 55 062763



**Auto Model Club de l'ouest**, Lojherhet 29470; Peuziat Michel, 98071764



**Crame Roncq**, Mons el Baroeul; Michael Hondekyn, 33-20042755



**CSRM**, Lyon 69009; Pierre-Yves Monfroy, 06 78880852



**Lorgies Bolides**, Lorgies 62840; Hourdequin Sabine



## GERMANY

**Dreykorn Raceway**, Lauf 91207; Hermann Hensel, 09123-81457



**MAC Zweibruecken**, Hueffler 66909; Matthew Bailey, 011-49-6384-1388; email: matthew\_w\_bailey@hotmail.com; web: www.geocities.com/matthew\_w\_bailey



**MC Koln**, Worringen 50769; Ralf Habel, 02733-477493



**Mini Car Club Dortmund**, Dortmund 4600; Roland Schwan, 0231/213609



**Oberhausen-Altstaden**, Oberhausen 46099; Josef Holl, 0208-403676



**Panik Raceway**, Troisdorf 53844; Guido Kraft, 0224-400259



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**Autodromo Accion**, San Pedro Sula; Colonia Rivera Hernandez; Eduardo Hondal, (504) 52-2061



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**H.K.R.C. Model Car Racing Club**, Hong Kong; Alex Chan, (852) 659-2822



**Kingsville Buggy Arena**, Shatin; Pak Yeung, (852) 607-0828

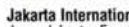


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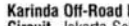
**Abadi Circuit**, Bandung, Jawa Barat 40141; Adi Darmawan, 62-22-2012250; email: darmawaa@bdg.cen-trin.net.id



**Ancof**, Jakarta, ACT 14350; Andre Supryanata, 62 21 6506040; email: andre@cbn.net.id; web: www.auvis.com/ja



**Jakarta International Twin Circuit**, Dki Jaya, Jakarta; Faykhun Andriadi, 6221-751243g; email: faykhun@soon.com



**Karinda Off-Road R/C Car Model Circuit**, Jakarta-Selatan 12440; Wiviv W. Soedarmadi, 62-21-7900878



**Pondok Cabecircuit**, JL. Kunir No. 83, Jakarta; Ali Agus Salim, 7403568-9; fax 7491533



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**Ircca Off-Road**, Rahanana; Yaron Zafir, (972) 030549937



**Nahshoneat**, Haifa 32809; Golan Levy, (972) 039386444 or (972) 04231252



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**AF MODELS RINGS**, COLLENO, ACT 10093; ADRIANO FORATO, +39.335.82.58.434; email: afmodels@net.it; web: www.afmodels.com



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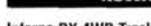
**Kadena R/C Car Club**, APO, AP 96367; Ron Nason, 011-81-611-733-1334; email: Ron\_Nason@hotmail.com; web: home.attmil.ne.jp/b/Carmen\_Nason/hom.htm



**Xiwakuni R/C Track**, FPO AP 96310-0978; David T. Eck, 81-6117-53-3662



**Yokota R/C Racers**, APO, AP 96326-0034; John Baker, 90-001-81-31175-7-6471; email: a4jb@yfa.attmil.ne.jp



**Zama Off-Road Raceway**, APO AP 96338; Ken Campbell, 81-3117-63-8478



## KUWAIT

**Inferno DX 4WD Track**, Ahadi 61002; Yousuf Acqatari



## LEBANON

**Wild Willy RCC**, Beirut, 00961-4-403751



## MALAYSIA

**ACME SPEEDWAY**, Georgetown, Penang, PB 10000; MOEY CHEE CHEONG, 604-2613175 & 6012-4189388; email: s\_jamm@hotmail.com



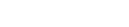
**Jump Square Arena**, Selanhor; Thomson Chong, (603) 656-2513



**Niko Sales & Service Centre**, Johor Bahru; Niko Cheng, (607) 234-3615; email: niko3@pd.jaring.my; web: www.niko.com.my



**Titivangsa Raceway**, Kuala Lumpur; R.A.C.E. Sdn Bhd., 03-2614496

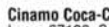


**TP Racing R/C Raceway**, Selangor; WONG SOO WEI, +603 56388160; email: wong@tp-racing.com

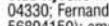


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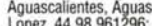
**Baja JR**, Guadalajara, Jalisco 45000; Memo, Pancho, 33-3671-5432/33-3832-0155; email: baja\_jr@hotmail.com



**Cinamo Coca-Cola**, Guadalupe, Nuevo Leon 67120; Sergio Garza, 83-35-70-09/79-32-33



**Club Kyosho Mexico**, Mexico, DF 04330; Fernando Lopez, 52 55 (56894150); email: Omega@avantel.net; web: www.speedshopmexico.com



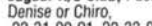
**Desstreza Racing Club**, Aguascalientes, Aguascalientes; Luis Lopez, 44 98 961296; email: luis\_lopez@jabil.com



**Hobby Center**, Guadalajara, JAL 45550; Alejandro Ortiz Del Toro, 36-21-46-28



**Hobby Model's Raceway**, Morelid, Michoacan 58260, 431-5-01-22



**Hobby's Formula**, DF 01120, 905-502-3620



**Jaguar R/C Club**, Puebla 72150; Denise or Chiro, 22-31-00-91, 22-33-00-94



**La Hielera**, Queretaro, QRO 76160; Jorge Morelos Rabell, 42-12-15-25



**Micromotori Club**, Jalisco, Jalisco 44640; Francisco Ortiz Sevilla, 52-36418872; email: fstmry@hotmail.com



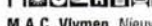
**NITRO RACERS**, San Jose del cabo / los cabos; FRANCO MEZA, (114) 1424422; email: tcstafe@prodigy.net.mx



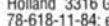
**Pista Casino**, Cuernavaca, Morelos 16507; Luis Duhart, 73-19-12-38



**R/C Racing Club**, Zapopan, Jalisco 44560; Fernando Hernandez, 3-616-73-47



**Tony's Track**, Culic-n, Sinaloa; Guillermo Prieto, 67-165708-168141



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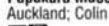
**ERCE Eindhoven**, Eindhoven, ACT 5627In; Henk Fick, 040-2480607; email: info@erceracing.nl; web: www.erceracing.nl



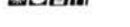
**H.F.C.C. Hollandia**, The Hague; G. de Jong, 031-070-3679820



**M.A.C. Vlymen**, Nieuwkuijk; Arjan van de Graaf, 31-416-376298



**R.C.T.D. Circuit**, Dordrecht, Zuid Holland 3316 GN; Jan van Kooy, 31-78-618-11-84; email: pkracing@bit.nl; web: www.pkracing.nl



## NEW ZEALAND

**Capital Model Racers**, Lower Hutt; Roger Whitmarsh, 04-566-5714



**Counties R/C Raceway**, Pukekohe; R. Northcott, 09-23-86904



**Harewood Radio Control Car Club**, Christ Church; Dean Johnson, 09-0-3880 344



**Papakura Indoor R/C Car Club**, Auckland; Colin Perry, 09-298-4711



**Western District R/C Off-Road Car Club**, Auckland; Chris, 09-838-5201



## NORWAY

**Aurskog R/C Club**, Aurskog; Tommy Gjeleseth, 47-63-86-21-61



**Dalen Raceway**, Molde; Johnny Reitan, 94 64 52 95



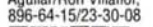
**Hadeland Raceway**, Gran; Dag Bakke-Nilssen, 61330405



**Lornskog RC Bane Track**, Sorlihavna; Terje Rosemo, 47-952-44269



**Store-Baller Raceway**, 3/17/99 61330225; Ola Raastad



## PHILIPPINES

**Boyet R/C Hobby Shop**, Rizal; Jose Chua, 721-2555



**Philippine F1/Touring Club**, Quezon City, Manila 1156; Raymond Aguilar/Ron Villalor, 896-64-15/23-30-08



**Philippine R/C Association**, Manila, Manila; Ronald/Manny Villalor, 23-30-08



**QCRCC Track**, Quezon City, Manila 1008; Emer Agero, 063-3386189; email: emerlitoa@quickweb.com.ph; web: www.qcrcc.cjb.net



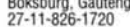
## PORTUGAL

**Aero Clube da Madeira**, Madeira, fax 091-221265



## SOUTH AFRICA

**B.R.C.A. Boksburg Radio Car Association**; email: recycle@netactive.co.za; web: www.recycle.co.za



**Banana County R/C Racing Club**, Margate 4275; Dennis Ste



**Pietersburg Model Racing,**  
Pietersburg, Northern Transvaal; Peter  
Van Vuuren, 0152- 293-0700



**Pretoria Model Racers,** Pretoria,  
Gauteng; Deon Cerf, 27-083-630-2045;  
web: www.pretoriarm.co.za



**Pretoria Off Road R/C Club,** Pretoria,  
Gauteng; Gert Swart, 012- 377-3238



**R.A.C.E. Off Road,** Maraisburg,  
Gauteng; Derrick Plank, 682-2173



**R.C. Superbowl,** Eisingburg,  
Johannesburg; Karl Fawcett,  
27119076145



**Rustenburg Off-Roaders,** Rustenburg,  
Northwest Province; Jan Van  
Vollenhoven, 0142- 24-846



## SPAIN

**A.D. Diabillios,** Zaragoza; Carlos  
Vicente de Vera, 34-76-605350



**ADAM,** Madrid; Alvaro Sarabia,  
01-7471113



**Club Modelismo Catilla,** Burgos  
09080; A.J. Pereda, 34-47-240130



**Club Social Sevillana,** Granada; Oscar  
Saenz, 958-275282



**CRAEM,** Madrid; Pablo Llorente,  
91-3865952



**Motoclub Castellon R.C.,** Castellon;  
Octavio Traver, (34) 64 229705,  
(34) 64-237411



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5-46632; Tage Johansson



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Lars Nordin, 46-0-340-38784;  
fax 46-0-340-38694; email: info@pro-  
car.se; web: www.procar.se



**Sollenbrunn Miniracing Club,**  
Alingsaas; Tage Johansson, 46-322-  
40944; email: tage.j@swipnet.se



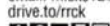
**Staffanstorps Highway 1:8 Track,**  
Staffanstorps 245 45; B'rje Petersson,  
46 0 46-256832



**torvinge raceway,** rappestad, SP  
59047 vikingstad; mats johansson,  
013-808445; email: mats.j@swipnet.se;  
web: drive.to/mirac



**Touring 1:10 Raceway (& Mini-Z  
Raceway),** Ronneby, Blekinge 372 35;  
Mikael Nilsson, +046 457 160 07;  
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drive.to/rck



## SWITZERLAND

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8854; Markus Schmid, 41-1- 8605229



**ERMC Raceway,** Grand-Saconnex  
1218; M. Maurer, 19-41-22-798-9765



**JMRCV-Terraindu Levant,** Geneva  
1290; fax 19 41 22 7790805



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**Hobbica Circuit,** Plong Maduea,  
Maung, Thailand 73000; Mr. Supakiet  
Thuwachardenpanich, 66-34-258808;  
email: hobbica@yahoo.com



**Hot Rod Raceway,** Bangkok 10310;  
Mr. Vichai Vongphate,  
(662) 8602922-5



## TURKEY

**B&B OTO G ven Raceway,** Istanbul,  
0216-4186118, or 0216-3490742



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241-4993



**Santa Paula R/C Club,** Caracas;  
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2423954 or 02-4510314



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| <input type="checkbox"/> Off-road | <input type="checkbox"/> Concrete       | <input type="checkbox"/> Automatic lap-counting |
| <input type="checkbox"/> On-road  | <input type="checkbox"/> Asphalt        | <input type="checkbox"/> Food available         |
| <input type="checkbox"/> Oval     | <input type="checkbox"/> Minis & Micros |   |

## KEY TO SYMBOLS

- |           |                    |
|-----------|--------------------|
| Indoor    | Concrete           |
| Outdoor   | Asphalt            |
| Off-road  | Minis & Micros     |
| On-road   | On-site hobby shop |
| Oval      | AC power           |
| Dirt oval | Auto lap counting  |
| Carpet    | Food available     |



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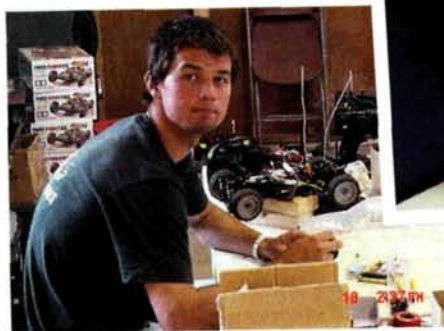
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## Bunks & Buggies

This month, the Backlot is in the hands of Taylor Morgan, (if you're a frequent flyer at the [rccaraction.com](http://rccaraction.com) bulletin boards you may already know him as [tadium54](mailto:tadium54)). Taylor hooked up with the Muskoka Woods Sports Resort in Ontario, Canada, to report on an ambitious RC program that the Muskoka Woods folks started there with their campers this year. Taylor, it's your show ....

In Canada, building and driving little cars around for fun and competition is a new idea for most people. The Muskoka Woods Sports Resort (in my opinion, one of the greatest camps in North America) in beautiful Muskoka, Ontario, created an introductory RC building and racing program for a group of summer campers.

Program director Matthew da Costa was a total newbie to RC when he got the idea for the camp program last September. After spending nine hours constructing and then running a Tamiya Fighter Buggy RX for himself, Matthew was sure that the RC car would be a hit with campers, and that he had found the right kit to use; other staffers who ran the buggy agreed completely.

Forty-four excited campers (11- to 15-year-old boys—and one girl) spent two hours per day, for six days, in supervised construction of Tamiya Mad Fighters. At the end of the week, they raced their buggies and got to take them home for keeps—complete with a Ni-Cd/NiMH 1880 Ultra Peak Charger from Prolux, three 1500mAh DuraTrax Shark packs, an Airtronics Blazer Sport radio package and an Airtronics F2000 ESC—plus the August 2002 issue of *RC Car Action* and a nice tote in which to carry all of it!

Although this was the Muskoka staff's first go at an RC program for its campers, it went very well. According to Matt, the outstanding services of Hobbycraft Canada were essential to the smooth running of

this program. Matt was also grateful for the enthusiastic and dedicated help of experienced RC enthusiast Darryl Fraser, who helped to plan and run the program.

The track construction at Muskoka is a good example of what can be done on a budget to introduce young newcomers to the hobby. The track was simply carved out in a grassy area with a lawn mower. After grooming it with a rake, the result was an ideal surface for the Mad Fighter buggies. Constructed from about 400 feet of 4-inch tile and a box of anodized dock spikes, the camp's track featured a couple of wooden jumps, a loop that had been scavenged from a dismantled miniature-golf course and a hinged starting gate.

The kids were utterly amazed by the speed and power of the buggies, and they loved performing catwalks, powerslides and burnouts. But it wasn't just the performance that impressed and captivated them; the kids took pride in building the cars and many gave their buggies sweet paint and sticker jobs. The campers even talked about which upgrades they want to perform first and about signing up for the program again next year! If they do, they'll be in for an even more exciting time; Matthew says nitro and touring cars are being considered for the program in 2003. I'll be there, too; this year, I just visited so that I could report on the "RC camp," but next year I'll be teaching it!

For more information on Muskoka Woods Sports Resort and how to get in on the RC car action there, check out its website at [muskokawoods.com](http://muskokawoods.com); you can also email Matthew at [matt@muskokawoods.com](mailto:matt@muskokawoods.com). You can email me, Taylor, at [tadium54@hotmail.com](mailto:tadium54@hotmail.com), too. ■

